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THE ANNALS
OF THE BOLUS HERBARIUM

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South African College

THE ANNALS
OF THE
BOLUS HERBARIUM

EDITED BY

H. M. L. BOLUS, B.A.

HON. CURATOR, BOLUS HERBARIUM

VOLUME II

WITH FIFTEEN PLATES AND SEVENTEEN TEXT-FIGURES

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ON THE FLORA OF KENTANI

By A. PEGLER, A.L.S.

Preface

The Kentani Division is situated in that portion of the South-East Coast Region known as the Transkei or Native Territories, lying between the Great Kei river and the Natal border.

Kentani village being taken as centre, most of the material of this List was collected within a radius of about five miles, including Silverstream (where the writer resides).

An occasional visit to the coast, usually Black Rock Cove, a sea-camp about six miles east of the Kei river, a drive through the Qora valley, flying visits to Manubi, Cebe, Nyutura, Qolora Station, leave by far the greater part of Kentani quite unexplored. Therefore it is obvious that the accompanying List must necessarily be very incomplete.

And even in this small village area one occasionally comes across shrubs whose foliage is familiar enough, but which seem never to bloom nor to increase in size. There are others again, fairly common yet occurring beyond my walking range, whose flowering period I have not happened to strike, as *Buxus MacOwanii*, *Pteroxylon utile*, *Podocarpus elongata* and *P. Thunbergii.*

For the naming of my collection I am indebted chiefly to the late Dr Bolus and his assistants, and also to the late Prof. MacOwan, Dr Schönland, Mr I. B. Pole Evans, Mr H. G. Flanagan and Dr E. P. Phillips.

After the name of each species in the list I have given the station, followed by the habitat, my herbarium number, relative frequency and flowering period.

1. Introduction

The District of Kentani[1] has for the most part well-defined natural boundaries, namely Qora river, Indian Ocean, Kei river, Gcuwa river, towards which it slopes on three sides.

But on the north and north-west crown land and private farms form but an artificial boundary. Formerly some of these farms were part of Kentani, but for convenience of court administration they were subsequently attached to Butterworth.

---

[1] I am indebted to Mr D. Barry and Mr E. Godfrey for furnishing statistical information regarding Kentani.

Entering Kentani by the Butterworth road the country, which is completely grass covered, slopes gently from an elevation of about 2700 feet. As Fair View is approached *Acacia Karroo, Ficus Capensis,* and *Cussonia spicata* appear with scrubby remnants of forests on hill sides.

At Fair View a distinct change is noticeable, the descent is more rapid, trees are more numerous, *Gymnosporia buxifolia* is frequent, tall grasses clothe the valleys and vegetation on the whole is more rank.

Just below Fair View occurs the peculiar formation known as the "Transkei gap"—a long valley, or series of valleys, running from west to east with here and there a natural bridge over which the road passes.

Leaving this Kentani Hill is on the right. This hill is supposed to be the highest point of Kentani with an altitude of approximately 2750 ft. In 1886 it attracted some attention, a diamond having been reported to have been found there. Claims were laid out and digging began with the result that clays of many beautiful colours and shades were revealed, but nothing diamondiferous.

From here the slope continues with various ups and downs until the village of Kentani is reached. This has an altitude of about 1200 ft.[1] From here the country falls in a series of undulations to the coast, the length thus described being about 35 miles, and the area of Kentani District being 434 square miles.

Twenty-five forests with an approximate area of 14,000 acres have been demarcated, and there are 31 lesser forests which have been reserved for future demarcation.

There are 4 plantations—namely at Kentani Hill, Kentani village, Qolora near the sea, and at Manubi. These do not as yet seem to have affected the natural vegetation.

The native population is about 38,000 and some idea may be formed of the consumption of wood when it is borne in mind that it is used not only for fuel, but for sticks (*Intonga*) which every man and boy carries, assegais, sleighs, brake blocks, stamp blocks, huts, kraals, and fences, where such exist, for gardens.

It is against native custom to use kraal wood for domestic purposes, therefore if for any reason a kraal is abandoned the fence is allowed to decay, and when the owner of a hut dies the hut is burnt.

For the year ending Sept. 1905 free permits were issued to natives of the Transkeian Territories to cut and remove from undemarcated forests produce valued at £28,309. 18*s*. 6*d*.

Now numerous small patches of forest, scrub, trees along streams, *Acacia Karroo* and *A. eriadenia* have been abandoned by the Forest Department as not being worth conservation and handed to the various Headmen to be used under their supervision for the benefit of the people; these are therefore doomed to speedy destruction.

---

[1] For this calculation I am indebted to Dr A. W. Rogers.

A native has no idea of economy and will sacrifice the finest tree for the sake of a single branch, or even to get at a bees' nest!

I have seen young mahogany trees used in the construction of the temporary hut (*Ipempe*) erected to shelter the women who frighten birds off the grain crops.

As live stock is for the most part free to wander at will, its influence on vegetation must also be considered.

Last December there were approximately 25,314 cattle, 41,379 sheep, and 28,817 goats in the district. Since that date the mortality among cattle has been very great due to East Coast fever, but more goats have been brought in, and it is these which do most damage.

Rainfall

The average annual rainfall at Kentani village during the past ten years was 38·04 inches.

It reached the minimum in 1904, being but 21·91. In the following year 1905 it reached the maximum, registering 50·51.

It is said that Kentani is drying up, and it is certain that surface water is less, streams are smaller, and marshes have disappeared.

Flowers once common are rare now, such as *Satyrium longicauda*, or depauperated as *Drimia macrantha*.

Perhaps increase of live stock, grass fires, and tree cutting may have something to do with this condition.

Grass fires

It has been asserted that if it were not for grass fires ticks would render Kentani uninhabitable—this was before compulsory dipping of cattle.

Be that as it may, to lovers of nature fires are an unmitigated evil. If the season is dry and the fires late the coarse grasses which border the woods and which in some measure protect them from stock are entirely consumed and with them much undergrowth.

Goats, which are particularly destructive, now find easy entrance, cattle soon follow, the damage thus done is deplorable, and each successive season finds the small wood with less powers of resistance.

Unfortunately the obnoxious *Helichrysum odoratissimum* is not killed by grass fires, the spring rains even when light revive it, and as it blooms in November the seedlings have time to establish themselves before the next fire.

Thousands of delicate plants must be destroyed, for years ago Kentani looked like a big flower garden, whereas now on the veld flowers are quite rare.

Aspect

For the greater part of the year the prevailing aspect of the vegetation is a yellowish green, due partly to the predominance of yellow flowered plants and also because the spring grasses soon lose their vivid green hue.

In order to give some idea of the varying aspect I have attempted to indicate the characteristic features of each month: those selected are fairly constant, some astonishingly so, although it must be borne in mind that plants which are quite common one season may be hardly seen the next.

Amount and time of rain, grass fires and their relation to rain, make a tremendous difference to all vegetation.

January

The softly rounded grass covered hills of Kentani have been described as looking like a vast spread of crumpled green velvet.

This universal green, combined now with yellow, is perhaps the most striking feature of this month, for now *Acacia Karroo* is in full bloom breaking the monotonous green with its dome of gold.

In the woods *Encephalartos* starts coning.

After the winter fires the veld grasses are kept short by stock, and seldom get a chance to seed. Among the most common are various species of *Andropogon, Eragrostis,* especially *E. plana, Anthistiria imberbis, Tristachya leucothrix,* and *Sporobolus fimbriatus.*

Aristida vestita occurs in patches; *Cynodon Dactylon* frequents mealie-lands and wherever there is human habitation.

Andropogon Nardus and *Erianthus capensis* are usually associated, and collectively are popularly called "Dobba." They take possession of valleys, border forests, etc. and as they are about 5 ft., growing in closely matted tufts with sharp cutting blades, they present a formidable obstacle to would-be explorers. Masses of *Cyperus immensus* grow along the small streams and *Phragmites communis* is found in marshy places.

At the coast *Dactyloctenium aegyptiacum* and *Stenotaphrum glabrum* make a thick carpet at the edge of the beach.

Purple *Ipomoea biloba* lies prostrate on sea sand, yellow *Hibiscus diversifolius* in marshy places among the scrub, among which *Gloriosa virescens* climbs, glorifying it with its glossy foliage and brilliant flowers.

February

A sullen sky, damp heat, and thunderstorms make February a peculiarly trying month, and drying herbarium specimens a most difficult task, but it is the time of our most brilliant flowers.

In the woods *Hibiscus Ludwigii* attains a height of about 7 ft., its yellow flower having a diameter of 5½ ins. *Gardenia Thunbergii* is a small beautiful tree with large white flowers, dark green foliage, and fruit and stem alike silver grey, and there is the smaller *G. Neuberia* which serves as lodging to the delicate white flowered *Angraecum Mystacidii.*

Here and there in this forest-shelter the frail rosy-red *Haemanthus Katherinae* is found, and more frequently the resplendent *Crocosmia aurea.* Purple *Streptocarpus Rexii* studs the fern-covered banks, and shell-pink *Crinum longifolium,* while *Luffa* climbs the trees, displaying its white flowers in the sunshine above.

Out of the green tangle of the woods purple *Dolichos Chloryllis* hangs from trees, the smaller *D. Lablab* contenting itself with shrublets. Through the tall valley grasses the small dark blue-flowered form of *Agapanthus umbellatus* pushes itself.

The handsome deep pink *Brunsvigia Josephinae* and *Satyrium macrophyllum,* of exactly the same hue, affect the shorter grasses; then come the numerous white heads of the tall *Cephalaria attenuata,* and the starry *Alepidia amatymbica,* while trees of all kinds carry the pretty but mischievous parasite *Loranthus Dregei.*

March

In addition to the late February flowers we now may see the delicate *Moraea spathacea,* but this so far as I know is confined to the village commonage, while the more robust *M. spathacea* var. *natalensis* ranges from the coast to Kentani Hill, and has a much longer period.

The bright yellow *Crassula vaginata* is common on the veld; *Crassula Peglerae* occurs on hill slopes, bordering flat stones with a fringe of pink-tinged white, and along the outskirts of woods sweet-scented *Clematis brachiata* envelops shrubs in a mantle of white, or just flings itself over the grass.

April

Pycnostachys reticulata and fragrant *Mentha aquatica* tinge the marshes lilac. *Leonotis Leonurus* sends out its gay vermilion spikes above the valley grasses, the subsocial *Watsonia angusta* occupies considerable patches on hill slopes making quite a show with its varying shades of red.

In the woods the shrubby *Plectranthus Ecklonii* and more slender *P. Peglerae* are in purple masses.

May

Red-pink *Syncolostemon densiflorus* is now in full bloom on the slopes, and twining yellow Senecios brighten the winter woods, namely *S. tamoides, S. quinquelobus, S. deltoideus.*

Male cones of *Encephalartos villosus* now mature, and when present are easily detected by their offensive odour.

Grass fires begin and last with more or less frequency until November.

June

Grass fires rage and for the most part the country presents a sombre appearance.

Red stemmed and red flowered *Cyrtanthus angustifolius* shows up well against the blackened veld, and the smaller less conspicuous yellow *Anoiganthus breviflorus* also appears.

It may be of interest to note that *Cyrtanthus angustifolius* seems to bloom any month provided the grass covering it has been burnt, coming up without leaves about 6—8 days after the fire. I can remember only on two occasions having found it in long grass, and then it was within a few feet of burnt grass. On these occasions the plants had leaves as well as flowers.

Aloe ferox now makes a blaze of red on the otherwise bare Kobonqaba hills.

At the coast *Strelitzia Reginae* crowns the sand dunes with its stately flowers of orange and blue.

July

What remains of old grass has now assumed a purplish tinge and is said at a distance to look like Scottish heather.

The pale *Mikania capensis* takes the place of the bright Senecios on the margin of the woods.

At the coast the shrubby *Cotyledon virescens* is found among the scrub, white *Agathosma ericoides* and lilac-pink *Barosma Peglerae* are seen on the veld.

Aloe ciliaris adorns the rocks overlooking Qolora mouth.

August

The handsome *Erythrina caffra* blazes out, warning natives that ploughing season is at hand, and the creamy *Cyrtanthus lutescens* looks its prettiest along sheltered streams.

September

On the veld *Dierama pendula* gives its dainty pink bells to the spring breezes. The social *Bobartia* tinges with yellow the hill slopes where it has established itself, and towards evening the creamy brown *Gladiolus tristis* unfolds and gives out its sweet perfume.

Ornithogalum lacteum and the ubiquitous *Zantedeschia africana* whiten the valleys.

Formerly *Satyrium longicauda* was quite a feature of this month, now it is rare, coming later in a depauperated condition.

At the coast *Zantedeschia africana* blossoms all the year round, and is there strongly scented.

Natives cook the stems with meal and say it makes an excellent dish, and this practice is fast diminishing this common but beautiful plant.

October

Various species of Hypoxis occur on the veld and in valleys, *H. Rooperi* being the largest, and all of them yellow, with the exception of *H. membranacea*, which is white.

Geranium ornithopodum (our only species) spreads its lilac flowers over valley grasses. Scarlet *Burchellia capensis*, white *Gardenia globosa* and *Tricalysia lanceolata* are in the woods. On the hills is the exquisite pale pink *Gladiolus oppositiflorus*, and at the coast the regal *Strelitzia augusta* rears its proud white head.

Among the scrub which borders the beach is the beautiful yellow and purple *Lissochilus speciosus*.

November

Queer shaped irregular grey patches on hill slopes and valleys mark newly ploughed native lands. White Pavettas are in the woods, orange *Satyrium Woodii* in the valleys, and *Zantedeschia albo-maculata* with its queer white-spotted leaves, which unlike *Z. africana* die off about March. *Drimia macrantha* pushes up its long bare peduncle and opens out its rich brown waxy flowers towards evening, the leaves following leisurely in February.

In waste places and along roads the gay *Senecio pterophyllus* occurs in shrubby profusion.

Helichrysum odoratissimum has taken almost entire possession of the veld about Tutura and is fast spreading in every direction.

December

Thunderstorms are frequent and violent, and vegetation luxuriant.

Calodendron capense, our finest and most beautiful flowering tree, gives a distinct colour to the forests, while the soft-tinted *Dais cotinifolia* with flowers much the same shade of lilac-pink adds to the effect.

Encephalartos ovulate cones are ripe and fall to pieces scattering the red seeds.

The lovely *Dierama pulcherrima* formerly found in the valleys is now never seen here.

Lichtensteinia makes a show of white on the valley slopes.

At the coast the vleis are blue with *Nymphaea stellata*, bright *Chironia laxa* on the Gogwana banks, white *Turraea obtusifolia*, *Pavetta*, and *Jasminum* among the scrub.

Shrubby *Acacia Benthamii* is seen on the slopes above with here and there the red, green-edged flowers of *Cyrtanthus obliquus*, and numbers of small flowers too numerous to mention, but mostly inconspicuous, except for the mesembrianthemums, which make a splendid show with their white and crimson of various shades.

Lobelia coronopifolia occupies a belt along the veld (at an altitude of perhaps 200 ft.) giving this region a distinct purple hue.

2. List of Plants

RANUNCULACEAE

Clematis brachiata, Thunb. Kentani, outskirts of forests, 415; common, 3—4.

Knowltonia vesicatoria, Curt. Gogwana River Mouth, hill slope, 1348; rare, 7.

Knowltonia bracteata, Harv. Kentani, valleys among tall grasses, 125; frequent, 10—12.

Ranunculus pinnatus, Poir. Kentani, among streams and in marshy ground, 97, 1754; frequent, 10—1.

ANONACEAE

Guatteria caffra, Sond. Kentani, forests, 722; common, 12—1.

MENISPERMACEAE

Cissampelos torulosa, E. Mey. Kentani, forests, 740; common, 9—12.

NYMPHAEACEAE

Nymphaea stellata, Willd. Vleis, near coast, 796; occasional, 11—1.

PAPAVERACEAE

Papaver aculeatum, Thunb. Kentani, 789; seen once in a mealie-land, 12.

Fumaria officinalis, Linn. Kentani, 519; seen once in a mealie-land, 11.

CRUCIFERAE

Heliophila stylosa, Burch. Kentani, hill slope, 139; rare, 12—2.

Heliophila rigidiuscula, Sond. Kentani, grassy plains, 259; rare, 11.

Heliophila subulata, Burch., var. glabrata. Coast flats, 445; frequent, 12—1.

Brassica Napus, Linn. Kentani, waste places, 1818; common, 12—1.

Senebiera didyma, Pers. Kentani, garden weed, 1796; common, 11—12.

Lepidium divaricatum, Soland., var. Kentani, usually near homesteads, 1411; common, 11—5. Canaries very fond of the seed.

Capparideae

Maerua triphylla, Dur. and Schinz. Qolora Mouth, 829; rare, 7.

Maerua undulata, Dur. and Schinz. Kentani, forests, 512; occasional, 6.

Capparis Gueinzii, Sond. Kentani, forests, 598; occasional, 1.

Violarieae

Ionidium capense, R. and S. Near Kobonqaba, 1460; rare, 9.

Ionidium caffrum, Sond. Kentani, damp sheltered places in valleys, 157; common, 9—12.

Bixineae

Rawsonia lucida, Harv. and Sond. Kentani, forests, 805; frequent, 9—11.

Scolopia Zeyheri, Presl. Black Rock Cove, 827; occasional, 7.

Doryalis rhamnoides, Harv. Kentani, forests, 807; frequent, 10.

Trimeria grandifolia, Warb. Kentani, forests, 746; common, 4.

Kiggelaria Dregeana, Turcz. Kentani, woods, 738; common, 3.

Pittosporeae

Pittosporum viridiflorum, Sims. Kentani, woods, 173; frequent, 5.

Polygaleae

Polygala oppositifolia, Linn., var. cordata, Harv. Coast, slopes, 306; frequent, 12—1.

Polygala tenuifolia, Link, var. linearis, Harv. Kentani, hill slopes, 149; occasional, 10—11.

Polygala virgata, Thunb., var. decora, Harv. Kentani, edge of woods when damp, 449; occasional, 2—3.

Polygala hispida, Burch. Kentani, among tall grasses, 130; common, 10—12.

Polygala serpentaria, E. and Z. Kentani, hill slopes, 168; rare, 3.

Polygala gymnoclada, MacOwan. Kentani, grassy slopes, 74; frequent, 9—10.

Polygala confusa, MacOwan. Kentani, outskirts of woods, 736; frequent, 12—2.

Muraltia laricifolia, E. and Z. Kentani, grassy slopes near woods, 283; occasional, 7—11.

Caryophylleae

Silene capensis, DC. Kentani, valleys, 433; occasional, 10—12. Opens about sunset.

Silene gallica, Linn. Kentani, waste land, 1412; 10—11.

Silene Burchellii, Otth. Black Rock Cove, along edge of scrub, 1311; frequent, 11—1.

Cerastium Dregeanum, Fenzl. Black Rock Cove, among thick matted grasses, 1291; occasional, 11—12.

Drymaria cordata, Willd. Kentani, bank of stream, 1169; seen once here and once at Manubi, 2—3.

PORTULACEAE

Anacamperos filamentosa, Sims. Kobonqaba, hills among stones, 1467; locally frequent, 9—2. Opens from about 3 to 5 p.m.

HYPERICINEAE

Hypericum natalense, Wood and Evans. Kentani, damp sheltered valley slopes, 117; frequent, 10—12.

GUTTIFERAE

Garcinia Gerrardii, Harv. Kentani, forests, 1242; flowers not seen, fruit, 7.

MALVACEAE

Malva parviflora, Linn. Kentani, waste places, 71; common, 10—12.

Malvastrum capense, Gray and Harv. Kentani, valleys, 56; rare, 11—2.

Sida triloba, Cav. Kentani, valleys near streams, 158; frequent, 10—12.

Sida longipes, E. Mey. Kentani, valleys and along roadside, 901; frequent, 10—12.

Sida rhombifolia, Linn. Kentani, valleys and waste places, 409; common, 2.

Hibiscus Ludwigii, E. and Z. Kentani, woods, 728; rare, 1—2.

Hibiscus diversifolius, Jacq. Near Black Rock Cove, along streams, 39; common, 8—4.

Hibiscus pedunculatus, Cav. Kentani, small woods, 107; common, 10—2.

Hibiscus aethiopicus, Linn., var. Kentani, along old footpaths, 47; frequent.

Hibiscus Trionum, Linn., var. Kentani, hill slopes, among tall grasses, 351; frequent.

Hibiscus Trionum, Linn., var. Black Rock Cove, hill slope, 447; common.

Hibiscus Trionum, Linn., var. β, ternatus. Kentani, valleys, among tall grasses, 129; occasional.

Hibiscus Trionum, Linn. Kentani, waste lands, 902; common, 11—2. A smaller plant.

Hibiscus vitifolius, Linn. Manubi, forest, among regrowth, 1266; locally frequent, 9—10.

Abutilon Sonneratianum, Cav. Kentani, valleys and under shelter of hill trees, 167; 9—3. Opens about 2 p.m.

Pavonia Meyeri, Mast. Kentani, valleys, 113; frequent, 1—2.

STERCULIACEAE

Dombeya Dregeana, Sond. Kentani, woods, 359; occasional, 11—2.

Dombeya cymosa, Harv. Kobonqaba, hill, 1452; rare, 7—8.

Melhania didyma, E. and Z. Kentani, valley slopes, 578; rare, 1. Visited many different hours and never found an open flower.

Hermannia flammea, Jacq. Near Black Rock Cove, on sand dunes, 37; occasional, 7.

Hermannia velutina, DC. Near Black Rock Cove, 453; rare, 4—7.

Hermannia parviflora, K. Schum. Near Xara, roadside, 1255; rare, 10.

TILIACEAE

Grewia occidentalis, Linn. Kentani, woods, 112; common, 9—12.

Grewia lasiocarpa, E. Mey. Kentani, forests, 273; common, 11—12.

Triumfetta pilosa, Roth. Kentani, chiefly waste lands, 747; common, 4.

Sparmannia palmata, E. Mey. Kentani, valleys, 384; frequent, 12—2.

Corchorus asplenifolius, Burch. Qolora Station, waste land, 2099; 10.

LINEAE

Linum Thunbergii, E. and Z. Kentani, valleys, 96; frequent, 12—2.

Erythroxylon pictum, E. Mey. Kentani, along streams, 78; occasional, 2.

GERANIACEAE

Monsonia ovata, Cav. Near Black Rock Cove, veld, 34; common, 12—2.

Geranium ornithopodum, E. and Z. Kentani, valleys, 1158; common, 10—11.

Pelargonium pulverulentum, Cav. Kentani, hillside bordering flat stones, 210; occasional, 10—11.

Pelargonium aconitophyllum, Harv. Kentani, hill slope, 2069, 1160; rare, 11—12.

Pelargonium aconitophyllum, Harv., var. latisectum, Knuth. Kentani, hill slope, 1159; rare, 11—12.

Pelargonium schizopetalum, Sweet. Kobonqaba, hills, 1458; rare, 9.

Pelargonium amatymbicum, Harv. Kentani, valleys, among tall grasses, 72; frequent, 9—10.

Pelargonium grossularioides, Ait. Black Rock Cove, marshy places, 222; locally frequent, 4.

Pelargonium lateripes, L'Hérit. Xara River and Kei Hills, 221, 1468; frequent, 9—12.

Pelargonium alchemilloides, Willd. Kentani, damp sheltered places, 98; common. Valleys, among tall grasses, 195; occasional, 9—12.

Pelargonium inquinans, Ait. Qolora Mouth, ledges of rock, 1447; occasional, 7.

Pelargonium vitifolium, Ait. Black Rock Cove, marshy places, 120; occasional, 11—1.

Pelargonium Bowkeri, Harv. Kobonqaba, hill, 2053; rare, 9.

Oxalis setosa, E. Mey. Kentani, shallow earth on margin of flat stones, 1808, 2014; occasional, 2.

Oxalis bifurca, Lodd., var. latiloba. Kobonqaba, drift, 695; locally frequent, 4.

Oxalis Smithii, Sond., var. latiloba. Kentani, valleys, waste land, 160; common, 10—2. This species occurs with double flowers.

Oxalis purpurata, Jacq. Kentani, valleys, among tall grasses, and in waste lands, 220; common, 10—12.

Oxalis corniculata, Linn. Universal, 917; 1—12. Troublesome garden weed. Waste land, 918; 7. Smaller in every way than 917, with paler flowers and less common.

RUTACEAE

Calodendron capense, Thunb. Kentani, forests, 296; common, 12.

Barosma lanceolata, Sond. Kobonqaba, grassy hill slope, 1249; occasional, 9.

Barosma Peglerae, Dümmer. Above Black Rock Cove, veld, 33; frequent, 7.

Agathosma Peglerae, Dümmer. Above Black Rock Cove, 795; frequent, 12.

Xanthoxylon capense, Harv. Kentani, forests, 802; common, 10.

Clausena inaequalis, Oliv. Kentani, forests, 776; frequent, 9.

Teclea natalensis, Sond. Kentani, forests, 823; occasional, 4—6; in fruit, 2081, 8.

Vepris lanceolata, A. Juss. Kentani, forests, 1287, 1288; frequent, 11.

OCHNACEAE

Ochna atropurpurea, DC. Kentani, chiefly along streams, 194; frequent, 10.

Ochna arborea, Burch. Kentani, forests, 1216; occasional, 8—9.

BURSERACEAE

Commiphora caryaefolia, Oliv. Kentani, forests, 1137; frequent, 8—9. Leaves appear in Nov. Black Rock Cove, 2082.

MELIACEAE

Turraea heterophylla, Sm. Kentani, among tall grasses, 730; frequent, 12—4.

Turraea obtusifolia, Hochst. Black Rock Cove, 337; common, 1—12.

Turraea floribunda, Hochst. Kei River, hills, 727; occasional, 11.

Ekebergia capensis, Sparm. Kentani, forests, 849; frequent, 9.

Trichilia emetica, Vahl. Kentani, forests, 1128; occasional, 10—12.

OLACINEAE

Apodytes dimidiata, E. Mey. Kentani, forests, 609; occasional, 11—12.

Cassinopsis capensis, Sond. Kentani, forests, 806; occasional, 10—11.

Pyrenacantha scandens, Hook. f. Kentani, outskirts of woods, 1368; rare, 10.

ILICINEAE

Ilex capensis, Sond. and Harv. Kentani, forests, 1366, 860; occasional, 11.

CELASTRINEAE

Cassine latifolia, E. and Z. Black Rock Cove, among beach scrub, 1351; occasional, 7.

Cassine velutina, Loes. Kentani, forests, 713; occasional, 10—11.

Cassine scandens, E. and Z. Kentani, woods, 743; frequent, 10—11.

Cassine papillosa, O. Kuntze. Kentani, forests and coast, 756; common, 4—7.

Cassine capensis, Linn. Near Qolora Mouth, woods, 1441; 6—7.

Pleurostylia capensis, Oliv. Kentani, along stream, 857; rare, 11.

Pterocelastrus variabilis, Sond., var. γ, armatus. Near Black Rock Cove, woods, 798; occasional, 8.

Putterlickia verrucosa, E. Mey. Kentani, woods, 602; common, 11—1.

Catha edulis, Forsk.? Flower and fruit unknown, 2111; rare.

Gymnosporia rubra, Loes. Kentani, woods, 298; frequent, 10—12.

Gymnosporia undata, Szysz. Kentani, woods, 1209; rare,

Gymnosporia buxifolia, Szysz. Black Rock Cove, woods, 1207; occasional, 7—8. Kentani, hill slopes, among tall grasses or large boulders, 58; 7—8.

Gymnosporia angularis, Sim. Kentani, valleys, 1244; rare, 7—9. Another form, 842; common.

Gymnosporia procumbens, Loes. Black Rock Cove, bordering beach, 842; frequent, 7.

Gymnosporia acuminata, Szysz. Qolora River, 1209; rare, 7—8.

Gymnosporia peduncularis, L. Bolus[1]. Kentani, along streams, 758; occasional, 5.

HIPPOCRATEACEAE

Hippocratea Schlechteri, Loesn., var. Peglerae, Loesn. Kentani, forests, 914; common, 1.

RHAMNEAE

Zizyphus mucronata, Willd. Kentani, woods, 610; common, 1.

Scutia Commersonii, Brongn. Black Rock Cove, bordering beach, 1344, 1299; common, 11—2.

Rhamnus prinoides, L'Hérit. Kentani, outskirts of woods, 11; common, 7—11.

Noltea africana, Reichb. Kentani, near streams, 5; frequent, 7—9.

Helinus ovata, E. Mey. Kentani, woods, 59; common, 11—2.

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[1] New combination.

AMPELIDEAE

Rhoicissus capensis, Planch. Kentani, forests, 267; common, 11. One of the "monkey ropes."

Rhoicissus cuneifolia, Planch. Kentani, woods and among tall grasses, 205; common, 11—1.

Rhoicissus rhomboidea, Planch. Kentani, woods, 1519; occasional. Flower not seen.

Cissus digitata, Lam.? Kentani, woods, 1520; common. Flower not seen.

? Cissus sp. Kentani, woods, 1502. Flower not seen.

Ampelopsis orientalis, Planch. Kentani, veld, clambering over tall valley grasses, 890; common, 11—2.

SAPINDACEAE

Cardiospermum Halicacaba, Linn. Near Qolora Mouth, in mealie-land, 868; locally frequent, 12—1.

Schmidelia monophylla, Presl. Kentani, woods, 832; common, 2—3.

Schmidelia melanocarpa, Arn. Kentani, woods, 710; occasional, 11—2.

Schmidelia leucocarpa, Arn. Black Rock Cove, 2119; common, 4. Shrub about 6 ft.

Hippobromus alata, E. and Z. Kentani, woods, 506; common, 7.

Pteroxylon utile, E. and Z. Recorded from the district but not collected by me.

Melianthus Dregeana, Sond. Kentani, valleys, 811; rare, 10.

Bersama lucens, Szysz. Qolora Mouth, 726; occasional, 12—1. Regrowth about here but no trees.

ANACARDIACEAE

Rhus pyroides, Burch. Kentani, chiefly along streams, 400; common, 12—2.

Rhus puberula, E. and Z. Kentani, among Erianthus, 898; occasional, 2.

Rhus dentata, Thunb. Kentani, among Erianthus, 900; frequent, 2.

Rhus laevigata, Linn. Black Rock Cove, 2120; frequent, 4. Shrub 3—4 ft. Kentani, woods, 865; occasional, 12. Tree about 20 ft. high.

Rhus laevigata, Linn., var. dentata, E. Mey. Kentani, valleys, 225; occasional, 2.

Rhus natalensis, Bernh. Black Rock Cove, 2054; occasional, 1.

Rhus Gueinzii, Sond., var. crispa, Engl. Kentani, along stream, 1446; rare, 2.

Rhus longifolia, Sond. Kentani, woods, 778; frequent, 8—12.

Rhus crenata, Thunb. Black Rock Cove, 2021; occasional, 4. Shrub about 2—3 ft.

Smodingium argutum, Sond. Kentani, valley, 899; rare, 2.

Harpephyllum caffrum, Benth. Kentani, forests, 1241; common, 11—2.

(To be continued)

A NOTE ON THE MALE INFLORESCENCE OF A SPECIES OF GNETUM FROM SINGAPORE

By A. ST CLAIR CAPORN, B.A.

THE material for this investigation was available through the kindness of Mr I. H. Burkill, Superintendent of the Botanic Gardens, Singapore. The spikes were collected by Mr J. W. Anderson, the assistant curator, from a climber growing in a corner of the Gardens Jungle. The name of the species is doubtful; Mr Burkill suggests that it may be *G. funiculare.*

1. EXTERNAL FEATURES

The male inflorescence is thick and compact, the internodes being short and completely hidden by the large cupules. The lowest two cupules retain evidence of their origin in the pair of teeth that each possesses. The total number of nodes in the specimens examined varied between 22 and 30; the average length of an inflorescence was 1·7 ins., the average maximum diameter being ·25 in.

A characteristic feature of every floral ring is its massiveness. The annular protuberance which bears the flowers projects very much: it is almost semicircular in longitudinal section (Fig. 2). Budded off from it in basipetal succession are one row of sterile female flowers and 3—4 horizontal rows of fertile male flowers, tufts of multiseptate hairs growing in among them. The number of ovulate flowers in each ring is approximately 20, the number of staminate, 30. It will be seen, therefore, that a single node may bear as many as 140 flowers. Owing, no doubt, to the fact that the floral ring is able to produce such a large number of flowers, mainly by virtue of its large diameter, the further activity of the meristematic zone at the base of the ring becomes unnecessary. Hence the cessation of flower production and the development of a circular fringe of hairs. This interpretation of the early abortion of the meristem derives support from the fact that, in the species of Gnetum whose inflorescences have narrow axes with elongate internodes, there is ample space left for the extension of the meristem in a downward direction.

2. Structure of Cupule and Apex of Axis

The cupules are bowl-shaped, rather flat, and with strongly upcurved rims. In the basal portion of each, just beneath the upper epidermis and overlying the leaf traces, there is a large, circular mucilage cavity of lysigenous origin (Fig. 2).

The presence of these mucilage cavities in an Indo-Malayan species is of special interest because Professor Pearson[1], after an investigation of forms from both regions, threw out the suggestion that a basis of distinction between African and Indo-Malayan Gneta might be found in the possession of mucilage canals by the former and the lack of them in the latter.

The individual mucilage cavities, non-septate in the region abutting on the stem, are prolonged into radiating diverticula in the upturned edges of the cupules. Along the thin cellular walls which separate these pockets ramifications of the leaf traces travel (Fig. 1).

The apical segment differs from all others, save occasionally the one directly beneath it, in that it bears no flowers. Moreover, it terminates the growth of the inflorescence (Fig. 2). Like the lower cupules, however, it contains a circular mucilage cavity; but the diameter of the circle is much smaller, so much so, indeed, that the central axis appears as little more than a narrow column of cells when seen in a median longitudinal section. The older the cone is, the more extensive the mucilaginous degeneration, and hence the narrower the column.

The behaviour of the vascular system in this portion of the inflorescence throws some light on its nature; for the main stele finally splits up into a ring of bundles which turn outwards beneath the annular mucilage cavity. It is concluded, therefore, that the last segment of the inflorescence is composed not only of the stem apex proper, but also of a cupule which has remained more or less completely concrescent with it[2]. A similar concrescence sometimes also affects the penultimate cupule (Fig. 2). As further evidence of this we have the small hemispherical protuberance in the sunken tip of the inflorescence,—doubtless the vestigial remnant of the arrested apical bud.

3. Vascular Anatomy

The central stele, containing nine main vascular bundles, gives off whorls of leaf traces which pass into the cupules. Each trace originates on a level with the lower edge of the flower-bearing ring. It is, owing to the confined space, compelled to descend to its cupule on a very steep course. Consequently the phloem is fused with that of the parent bundle for a very short distance (Fig. 3). A study of successive transverse sections shows that the leaf trace, just before entering the base of the cupule, divides into 2—3

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[1] Pearson, 1912.

[2] Cf. Pearson, 1915, p. 159.

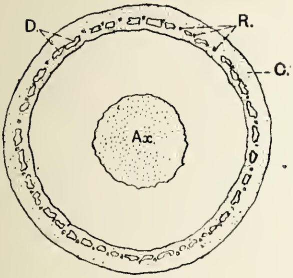

Fig. 1

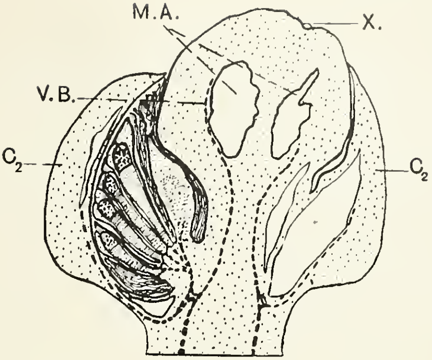

Fig. 2

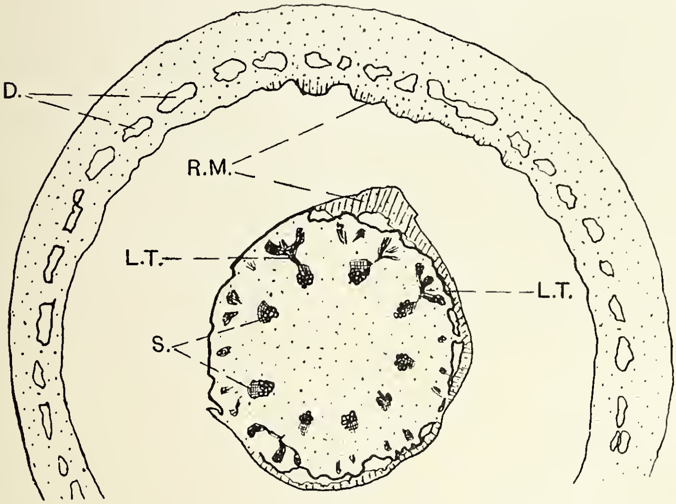

Fig. 4

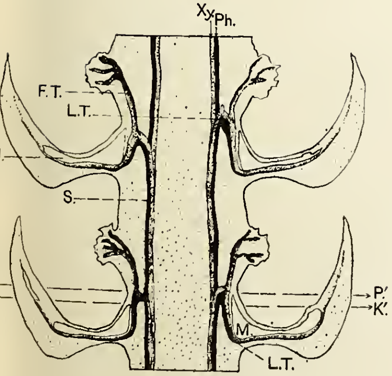

Fig. 3

A. St C. C., del. e sicco

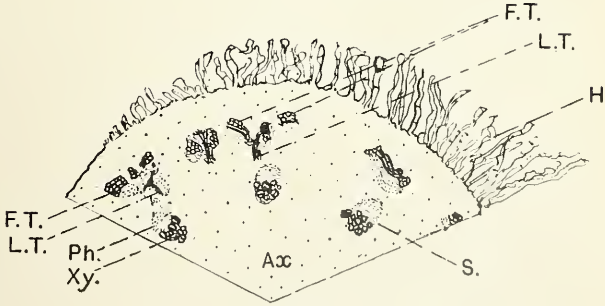

Fig. 5

Gnetum sp.

branches that travel outwards beneath the mucilage cavity, where further subdivision ensues.

The vascular supply of the remainder of the node, namely the floriferous portion, is derived entirely from the leaf traces. At the point where each of the latter undergoes fission there arises, by two or more roots, a "flower trace" which ascends sharply towards the vascular complex in the floral ring (Figs. 3, 5).

A series of transverse sections through the region where the leaf traces originate show that the inversely orientated flower traces, cut in almost true tranverse section, are peripheral and overlie the incoming leaf traces, which are obliquely cut (Fig. 5).

The course of the bundles in the floral complex is somewhat involved, but it is possible to follow out the main branches of the flower trace with a fair degree of accuracy. Those which pass into the rows of staminate flowers, 3—4 in number, do so in a more or less horizontal direction, with the result that in a tranverse section one sees, just beneath the flowers at the periphery, the branch bundles of the inversely orientated flower traces, from which latter they are separated by a space. The branches to the sterile female flowers, on the other hand, are obliquely vertical, so that in a transverse section of the inflorescence they are found to be continuous with the flower traces.

The vascularisation of each male flower consists of a small bundle up the centre of each of the two perianth segments, and a pair of bundles—which, like the others, are made up mostly of spiral elements—that travel up the antherophore.

4. Comparison with other Forms

As most of the features in which this species differs from others already described have now been mentioned this section will partake chiefly of the nature of a summary. The important points to be noted are the following:

(1) The condensed nature of the whole inflorescence, its conspicuous nodes and short internodes.

(2) The great number (20) of barren female flowers in each floral ring. Karsten[1] investigated the male inflorescences of six Malayan species and found an average number of nine sterile ovulate flowers per node.

(3) The large diameter of every floral ring and the consequent increase in flower production without recourse to a considerable extension of the meristematic zone that develops the flowers, as, for instance, in the Malayan species investigated by Karsten, where the parastichies were deep enough to

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[1] Karsten, 1893, p. 343; Pearson, 1915, p. 155.

contain as many as seven flowers each (our species has parastichies of four members).

(4) The presence of cupular mucilage cavities,—a character hitherto believed to be possessed solely by the African Gneta. It is also of interest to note in this connection that the mucilaginous degeneration of the pith in the older parts of the inflorescences of the African species is apparently without its counterpart in this Malayan form.

(5) The constitution of the apical segment of the inflorescence; viz. an aborted terminal meristem with a concrescent cupule.

(6) The absence of vascular bundles passing out from the main stele to the top of each floral complex,—the so-called "internodal or 'descending' traces." Herein this species conforms in every respect with the suggestion deduced by Professor Pearson in regard to the Indo-Malayan forms, i.e. suppressed internodes are correlated with suppressed internodal traces.

(7) The lack of anything which can be identified with the "augmenting bundles" described by Mrs Thoday[1] in the female spikes of many Gneta.

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[1] Thoday (1911).

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South African College.

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EXPLANATION OF PLATE I

Lettering. Ax. = Axis of inflorescence. C. = Cupule. D. = Diverticula of mucilage cavity. F.T. = Flower trace. H. = Septate hairs. L.T. = Leaf trace. M. = Mucilage cavity. M.A. = Mucilage cavity of apical segment. Ph. = Phloem. R. = Leaf trace branches. R.M. = Parts of roof of mucilage cavity. S. = Bundles of stem stele. V.B. = Vascular bundle. X. = Stem apex. Xy. = Xylem.

Fig. 1. Transverse section through upper part of cupule. Semidiagrammatic.
„ 2. Median longitudinal section of tip of inflorescence. Semidiagrammatic. × 15.
„ 3. Longitudinal section to show vascular system. Diagrammatic. × 10.
„ 4. Section K—K′ of Fig. 3. × 12.
„ 5. Part of section P—P′ of Fig. 3. × 21.

NOVITATES AFRICANAE

Oxalis Guthriei, Bol. f. (*Geraniaceae-Oxalideae*). *O. englerianae* proxime accedit sed pilis eglanduliferis corollaque longiore.

Herba 10·5—17 cm. alta vel ultra, pilosa, pilis mollibus, albis, crispulatisque; bulbus non visus; caulis exsertus, teres, pilis ad basin densioribus, foliis 1—2 vel squamis pilosis donatus; folia digitate 3—7-foliolata, caulis apice aggregata, petiolis pilosis, 0·6—3·5 cm. longis, foliolis linearibus vel lineari-oblongis, obtusis vel apice subemarginatis, supra glabris, dilute olivaceo-viridibus, infra pubescentibus vel pilosis, saepissime rubro-callosis, viridi-brunneis, ciliatis, 0·7—1·2 cm. longis, 0·2—0·4 cm. latis; pedunculi 1-fl., dimidio superiore bibracteolati, bracteolis oppositis vel suboppositis, pilosis, ad 0·25 cm. longis; calyx 0·55—0·65 cm. longus, segmentis lanceolatis, acuminatis, pilosis, longo-ciliatis; corolla subhypocrateriformis, 1·5—2·5 cm. longa, fauce circa 0·65 cm. diam., apice circa 1·9 cm. diam., tubo puberulo, petalorum lamina rotundata, apice marginibusque pubescente, ? purpurea; filamenta ad basin parce puberula, edentata; ovarium dimidio superiore pilosum, 0·2 cm. longum, stylis pilosis, pilis adscendentibus.

Cape Province: South-Western Region; Caledon Div., near Caledon, *F. Guthrie*, 4157.

Very close to *O. engleriana*, Schltr., but eglandular and the corolla shorter.

O. Pearsonii, Bol. f., *O. mutabili* accedit, sed pedunculis brevioribus, corolla longiore, foliolarum forma indumentoque differt.

Herba 3·75 cm. alta; bulbus ovalis, laevis, niger vel atrobrunneus, 2 cm. longus, 1·1—1·2 cm. latus; caulis non exsertus; folia trifoliolata, petiolis dense villosis, 0·9—1·7 cm. longis, foliolis mediis late cuneatis, apice obtusis vel deltoideis, lateralibus subobliquis, subobovatis, apice obtusis vel deltoideis, utrinque punctatis, superne villosis, inferne venosis, tenue pilosis denseque ciliatis crassis pilis praecipue valde prominentibus nervis, marginibus interdum purpureo-roseis, 0·8—1·1 cm. longis, 0·45—0·6 cm. latis; pedunculus 1-fl., dense villosus, 0·45—0·9 cm. longus, circa medio bibracteolatis, bracteolis oppositis plus minusve villosis; calyx 0·55—0·6 cm. longus, segmentis apicem infra bicallosis, callis rubris, exterioribus ovatis, subacutis, pilosis vel villosis, ciliatis, 0·25 cm. latis, interioribus elliptico-oblongis, obtusis, paulo angustioribus quam exteriores, glabris, vel margine apiceque pilis longis pauce ornatis; corolla infundibuliformis, 2·8—3·4 cm. longa, apice circa 1·7 cm. diam., petalorum lamina apice rotundata, ciliata, dilute lilacina; filamenta glabra, interioribus dentatis; ovarium supra medium pubescens, apice rubro-glandulosum, 0·175 cm. longum, stylis tenuiore pilosis.

Little Namaqualand: Western Region; on the Khamiesberg at Kamsoap Ravine and Bailie's Vlakte, fl. Sept., *H. H. W. Pearson* (Percy Sladen Memorial Expedition, No. 6549, 6538).

This rather curious species seems to be nearest to *O. mutabilis*, Sond., from which it differs in the shorter peduncles, longer corolla, and in the shape and indument of the leaflets.

O. georgica, Bol. f., *O. imbricatae*, var. β accedit sed foliolis subrotundis minusque pilosis, corolla breviore et stylis pilosis, pilis adscendentibus.

Herba 7·5 cm. alta; bulbus non visus; caulis ut videtur parum exsertus; folia 3-foliolata, petiolis patenti-pilosis, 1—2 cm. longis, foliolis subrotundis, obtusis vel inconspicue emarginatis, mediis subcuneatis, supra glabris, pallide olivaceis, infra plus minusve tenue patenti-pilosis, subnervosis, rubro-brunneis, praecipue superiore dimidio ciliatis, pilis sublongis patentibus, 0·4—0·55 cm. longis, 0·5—0·65 cm. latis; pedunculi 1-fl., pilosi, pilis sublongis patentibus, 5—6·5 cm. longi, superiore dimidio bibracteolati, bracteolis oppositis, glabris vel parce pilosis, ad 0·45 cm. longis; calyx 0·35—0·4 cm. longus, segmentis lineari-oblongis, subacutis vel obtusis, pilosis; corolla infundibuliformis, glabra, 1·4 cm. longa, fauce 0·6 cm. diam., apice 1·3 cm. diam., petalorum lamina apice rotundata, purpurea; filamenta glabra vel superiore dimidio parcissime minuteque puberula, interioribus longidentatis; ovarium manifeste stipitatum, inferne glabrum, ad apicem pilosum, 0·15 cm. longum, stylis pilosis, pilis adscendentibus.

Cape Province: South-Western Region; George Div., North Station near George, fl. Jan., *F. Guthrie*, 4283.

Nearest to *O. imbricata*, E. and Z., but differs in having the leaflets subrotund and less hairy, the corolla shorter and the styles densely pilose with ascending hairs.

Described from a single specimen the lower portion of which is imperfect.

O. fibrosa, Bol. f., *O. viscidulae* accedit sed foliolis multo minoribus, petiolis pedunculisque brevioribus, corollae forma dissimili differt.

Herba 1·75—2·5 cm. alta; bulbi nigri vel atro-brunnei, tunicis crasse fibrosis, ad 8·5 cm. longi; caulis non exsertus; folia 3-foliolata, petiolis basi valde dilatatis, cum pedunculis satis brevibus albis, pellucidis pilis, cum glanduliferis interjectis, donatis, 0·2—0·55 cm. longis, foliolis obcordatis vel subrotundis, supra laevibus, viridibus, pilis, paucis, brevibus, pellucido-albis conspersis, marginibus parum involutis, infra pilosis, pilis longis, rectis, nitentibus, pellucido-albis, 0·2—0·25 cm. longis, 0·15—0·2 cm. latis; pedunculi 0·1—0·35 cm. longi, dimidio inferiore bibracteolati, bracteolis oppositis vel alternis; calyx 0·3 cm. longus, segmentis ovatis, acutis, pilis crispulatis, pellucido-albis, brevibus glanduliferis interjectis, plus minusve ciliatis, purpureo-notatis; corolla subhypocrateriformis, minute puberula, 1·5—2 cm. longa, petalorum lamina apice rotundata, pallido-lilacina; filamenta glabra, interioribus minute dentatis, dentibus apice purpuratis; ovarium apice pubescens, 0·1 cm. longum, stylis basi pubescentibus.

Cape Province: Karroo Region; Worcester Div., near Matjesfontein, fl. May, *F. Bolus* (Bolus Herb. No. 13379).

Nearest perhaps to *O. viscidula*, Schltr. from which it differs in the much smaller leaflets, the shorter petioles and peduncles, and in the different shape of the corolla.

O. aureo-ciliata, Bol. f., *O. variabili* accedit sed foliolis densissime ciliatis, pilis perbrevibus, rigidis, nitentibus, flavidis vel albidis, coriaceis, petiolis pedunculisque rigidioribus.

Herba 3·5—5·5 cm. alta; bulbus ignotus; caulis non exsertus; folia 3-foliolata, petiolis teretibus, glabris, pubescentibus vel pilosis, 1—2 cm. longis, foliolis subrotundis, obtusis vel rare subacutis, petiolulatis, mediis e basi cuneata, lateralibus obliquis plus minusve e basi rotundata, utrinque minute punctatis, supra pallidioribus, glabris vel tenue pilosis, pilis brevibus, subrigidis, strictis, appressis, flavo-albidis, immaturis reticulatis, infra glabris, nervosis, 1—1·4 cm. longis, 0·8—1·5 cm. latis; pedunculi 1-fl., teretes, pubescentes vel plus minusve dense pilosi, 0·6—1·6 cm. longi, medio bibracteolati, bracteolis oppositis, glabris vel pubescentibus, ad 0·35 cm. longis; calyx 0·45—0·75 cm. longus, segmentis exterioribus ovatis, acutis vel subacutis, 0·35 cm. latis, interioribus paullo brevioribus angustioribusque, pubescentibus, ciliatis, ad apicem pilis paullo longioribus; corolla infundibuliformis, 2·5—3·5 cm. longa, apice 2·5—2·75 cm. in diam., petalorum lamina obovata, subtruncata, apice ciliata, ? pallide purpurea; filamenta glabra, interioribus dentatis; ovarium dense pilosum, 0·15 cm. longum, stylis tenue pilosis pilis adscendentibus.

Cape Province: Western Region; Little Namaqualand, near Steinkopf, fl. May, *Max Schlechter*, 73.

Nearest to *O. variabilis*, Lindl., but differs in the leaflets being leathery and very densely ciliate with very short, rigid, golden-yellow or whitish shining hairs, and in the petioles and peduncles being more rigid.

O. saronensis, Bol. f., *O. multicauli* accedit sed habitu, corollae pedunculorumque longitudine differt.

Herba 10—11 cm. alta; bulbus ignotus; caulis exsertus, subdense glanduloso-pubescens, inferne 1—2 squamis, late ovatis, obtusis, glabris ornatus, superne foliatus; folia omnia vel fere omnia ad apicem caulis aggregata, 3-foliolata, petiolis dense pilosis, pilis pellucidis, albidis, glanduliferis interjectis, 0·4—2·1 cm. longis, foliolis ovalibus vel oblongo-ovalibus, obtusis vel leviter emarginatis, supra glabris, infra crebre nigro-callosis, plus minusve dense pilosis, pilis longiusculis, albidis, nervo medio marginibusque autem pellucidis, albidis, glanduliferis, 0·5—0·85 cm. longis, 0·3—0·4 cm. latis; pedunculi 1-fl., terminales lateralesque, petalorum indumento, post anthesin deflexi, 1·2—4 cm. longi, bibracteolati, bracteolis saepissime paullo infra apicem, ad 0·3 cm. longis, alternis cum sepalis glandulifero-pilosis, pilis pellucidis, albidis; calyx 0·5—0·6 cm. longus, segmentis lanceolatis, acutis vel subacutis, glanduloso-ciliatis; corolla infundibuliformis, 1·8—2·7 cm. longa, apice circa 1·7 cm. diam., tubo puberulo, pilis glanduliferis interjectis, petalorum lamina apice rotundata, marginibus apiceque puberulis, pilis glanduliferis interjectis, rosea vel purpurea; filamenta glabra, interioribus dentatis; ovarium ad apicem pilosum, 0·25 cm. longum, stylis infra medium pilosis, pilis adscendentibus, supra medium glabris vel minute puberulis.

Cape Province: South-Western Region; Tulbagh Div., near Saron, 900 ft., fl. June, *R. Schlechter*, 7858.

Nearest to *O. multicaulis*, E. and Z., but differs in habit, and in the length of the corolla and peduncles.

O. Lawsonii, Bol. f., *O. collinae* accedit sed foliolis clausis subfalcatis nec undulato-crenatis atque circuitu diverse conformatis distinguitur.

Herba 4·5 cm. alta; bulbus ignotus; caulis non vel vix exsertus; folia 3-foliolata, petiolis plus minusve dense pilosis, pilis patentibus, albis, 1·75—3·75 cm. longis, foliolis subrotundis vel late oblongis, mediis nonnunquam ovato-orbicularibus, lateralibus subobliquis, apice rotundatis vel subtruncatis, subemarginatis, utrinque conspicuissime punctatis, supra glabris, infra pilosis, pilis patentibus, albis, saepissime per nervos densioribus et nonnunquam modo per eos, marginibus involutis, 0·6—1·1 cm. longis, 0·5—1 cm. latis; pedunculi 1-fl., petiolorum indumento, 1·75—2·2 cm. longi, supra medium bibracteolati, bracteolis alternis, linearibus, pilosis vel subglabris, ad 0·45 cm. longis; calyx 0·7 cm. longus, segmentis lanceolatis vel oblanceolatis, acutis, 1—2 nonnunquam latioribus minusque acutis, dense pilosis; corolla infundibuliformis, 2—2·5 cm. longa, petalorum lamina apice rotundata, marginibus apiceque parce pilosis, rosea; filamenta glabra vel puberula, interioribus nonnunquam dilatatione vel minuto dente ornatis; ovarium apice vero pilosum, 0·3 cm. longum, stylis glabris vel puberulis, pilis paucis longis sparsis albis.

Nearest to *O. collina*, E. and Z., but distinguished by the differently shaped leaflets which are somewhat falcate when closed, and not wavy-crenate.

Cape Province: Kalahari Region; Barkly West Div., Daniel's Kuil, fl. March, *Rev. G. M. Lawson* (Bolus Herb. No. 13378); Kuruman Div., Lupane in the Langeberg, ca. 3800 ft., fl. Apl., *A. W. Rogers* (Bolus Herb. No. 12565).

O. argillacea, Bol. f., *O. angustae* proxime accedit sed foliolis circuitu subdissimilibus brevioribusque et corolla flava.

Herba 5—9 cm. alta, pilosa, pilis longis, pluri-cellularibus, pellucidis, albis; bulbus non visus; caulis vix, vel ad 4·5 cm., exsertus, dense pilosis, 2—4 squamis, ovatis, obtusis, donatus; folia 3-foliolata, valde copiosa, ad apicem congregata, petiolis basi dilatatis, 1·3—3 cm. longis, foliolis lineari-cuneatis, acute emarginatis, segmentis rotundatis, nonnunquam apice dilatatis recurvatisque, supra glabris, 0·8—1·5 cm. longis, apice 0·25—0·3 cm. latis; pedunculi 1-fl., basi dilatati, 1·75—3·5 cm. longi, dimidio superiore bibracteolati, bracteolis alternis vel suboppositis; calyx 0·6—0·65 cm. longus, segmentis lineari-lanceolatis, acuminatis; corolla infundibuliformis, vel subhypocrateriformis, glabra, aureo-flava, 2—3·2 cm. longa, fauce 0·6—1·1 cm. diam., apice 2—2·5 cm. diam., petalorum lamina rotundata; filamenta parcissime glanduloso-pubescentia, e basi 0·1 cm. indivisa; ovarium glabrum, manifeste stipitatum, 0·15 cm. longum, stylis glabris.

Cape Province: South-Western Region; Clanwilliam Div., near Augsburg, 500—900 ft., fl. Apl.—July, *C. L. Leipoldt*, 700.

Very near *O. angusta*, Sond., from which it differs in the shorter and somewhat differently shaped leaflets and in the yellow corolla. Dr Leipoldt described it as being very local, and growing, generally socially in clumps, only in hard Karroo clay soil.

O. copiosa, Bol. f., *O. Smithii*, var. *a latilobae* accedit sed foliis floribusque magis numerosis, foliolis multo minoribus, lobis brevioribus et corolla flava distinguitur.

Herba 10·5—12·5 cm. alta; bulbus non visus; caulis non exsertus, foliis squamiformibus, bulbillos in axillis ferentibus, donatis; folia 3-foliolata, plurima, petiolis tenuibus, omnino glabris, ad 4 cm. longis, foliolis polymorphis, saepissime obcordato-bilobis, supra punctatis vel laevibus, infra punctatis, omnino glabris, ad 0·5 cm. longis, 0·7 cm.

latis, lobis patentibus, rotundatis, ad 0·3 cm. latis; pedunculi 1-fl., glaberrimi, 7—9 cm. longi, dimidio superiore bibracteolati, bracteolis oppositis, glabris, ad 0·35 cm. longis; calyx 0·55 cm. longus, segmentis lanceolatis, subacutis, nonnunquam imparibus, glabris vel ad apicem ciliolatis; corolla infundibuliformis, glabra, saturate flava, 1·9—2·5 cm. longa, petalorum lamina rotundata; filamenta glabra, interioribus dentatis; ovarium dimidio inferiore glabrum, superiore pilosum, manifeste stipitatum, 0·25 cm. longum, stylis dense pilosis, pilis adscendentibus.

Little Namaqualand: Western Region; near Klipfontein, 3100 ft., fl. Aug., *H. Bolus*, 6653.

Nearest to *O. Smithii*, Sond., var. *a latiloba* but with the leaves and flowers more numerous, the leaflets much smaller, the lobes shorter and the corolla yellow.

O. Henrici, Bol. f., *O. Zeyheri* (ex descr.) accedit sed indumento glandulifero, foliolis paucioribus, pedunculis longioribus et corolla glabra differt.

Herba gracillima, 6·5—10 cm. alta, plus minusve pubescens, pilis eglanduliferis vel glanduliferis interjectis; bulbus ovalis, laevis, ad apicem attenuatus, castaneo-coloratus, 1·5 cm. longus, 0·9 cm. latus; caulis exsertus, inferiore parte squamis 2—3, late ovatis, obtusis donatis; folia digitate 3—5-foliolata, petiolis 0·5—0·95 cm. longis, foliolis linearibus, ad basin parum attenuatis, plus minusve emarginatis, infra apicem marginibusque rubris callis ornatis, superne glabris, inferne puberulis, 0·15—0·3 cm. longis, 0·075—0·1 cm. latis; pedunculi 1-fl., 2·7—8 cm. longis, dimidio superiore bibracteolati, bracteolis oppositis vel suboppositis, 0·1—0·13 cm. longis; calyx 0·35 cm. longus, segmentis lanceolatis vel ovato-lanceolatis, acutis, puberulis, ciliatis, nonnunquam margine purpureo; corolla subhypocrateriformis, glabra, 1·5—2 cm. longa, fauce circa 0·4 cm. diam., apice circa 1 cm. diam., petalorum lamina obovata, rotundata, ? lilacina; filamenta glabra; ovarium ad apicem pubescens vel pilosum, vix 0·2 cm. longum, stylis pubescentibus, pilis dimidio inferiore multo densioribus.

Cape Province: South-Western Region; Worcester Div., near De Doorns, fl. April, *H. Bolus*, 13079.

This appears to be nearest *O. Zeyheri*, Sond. (ex descr.), but differs in the glandular pubescence, fewer leaflets, longer peduncles and glabrous corolla.

O. exigua, Bol. f., a ceteris acaulescentibus quae foliola obcordata habent propter omnes partes, praeter flores, glaberrimas, staturam minimam, et foliola polymorpha facile distinguitur.

Herba 1·5—2 cm. alta; bulbus (unus immaturus visus) apicem versus e paullo infra medium sensim attenuatus, minute crebreque longitudinaliter punctatus, atro-brunneus, 2·25 cm. longus; caulis non exsertus; folia 3-foliolata, petiolis basi late dilatatis, dilatationibus petalorum exteriorum interdum conspicue lobatis, omnino glabris, 0·4—1·5 cm. longis, foliolis polymorphis, saepissime obcordatis, conspicue utrinque punctatis, petiolulatis, omnino glabris, 0·25—0·4 cm. longis, 0·25—0·45 cm. latis; pedunculi 1-fl., omnino glabri, 0·4—0·7 cm. longi, dimidio superiore bibracteolati, bracteolis oppositis, glabris, ad 0·15 cm. longis; calyx 0·35 cm. longus, segmentis oblanceolatis, acutis, glabris, saepe infra apicem purpureis; corolla infundibuliformis, 1·1—1·3 cm. longa, fauce circa 0·4 cm. diam., apice circa 1·1 cm. diam., tubo puberulo, petalorum lamina apice marginibusque puberula, subtruncata; filamenta glabra, interioribus edentatis; ovarium apice minute puberulum vel pilosum, 0·15 cm. longum, stylis minute puberulis, e basi 0·1 cm. indivisis.

Cape Province: South-Western Region; Clanwilliam Div., near Zoutrivier, 450 ft., fl. July, *R. Schlechter*, 8106.

Easily distinguished from all the other acaulescent species with obcordate leaflets by its being entirely glabrous in all parts except the flowers, its small size, and its polymorphic leaflets.

O. arenosa, Bol. f., *O. saronensi* accedit sed foliolorum forma indumentoque, corollae colore differt.

Herba 3·5—8 cm. alta; bulbus ignotus; caulis exsertus, glanduloso-pilosus, conspicue striatus, inferne nudus vel 1—2 squamis, late ovatis, obtusis ornatus; foliis omnibus ad apicem aggregatis vel rarius squama inferiore folifera; folia 3-foliolata, petiolis glanduloso-pilosis, 0·5—2 cm. longis, foliolis oblongo-cuneatis, emarginatis, supra minute punctatis, glabris, infra punctatis parcissime pilosis, medio nervo nonnunquam glanduloso-piloso, subdistanter glanduloso-ciliatis, 0·4—0·85 cm. longis, 0·2—0·4 cm. latis; pedunculi 1-fl., terminales lateralesque, nonnunquam striati, glanduloso-pilosi, 1—3·9 cm. longi, paullo infra apicem bibracteolati, bracteolis oppositis vel suboppositis, ovatis vel lanceolatis, acutis, pilosis; calyx 0·4—0·5 cm. longus, segmentis lanceolatis vel oblanceolatis, obtusis, parce pilosis, pilis eglandulosis vel glandulosis intermixtis, exterioribus quam interiores latioribus, subdense eglanduloso-ciliatis; corolla infundibuliformis, 1·75—2·25 cm. longa, petalorum lamina apice rotundata, marginibus apiceque pubescente, alba; filamenta glabra, interioribus dentatis; ovarium 0·15 cm. longum, supra medium cum stylis dense pilosum, pilis crassis sublongis.

Cape Province: South-Western Region; Piquetberg Div., near Piquetberg, fl. June, *R. Schlechter*, 7915.

Nearest to *O. saronensis*, Bol. f., but differs in the shape and indument of the leaflets and in the colour of the corolla.

O. minutifolia, Bol. f., *O. polytrichae* accedit, sed foliolorum indumento, petiolis corollaque brevioribus differt.

Herba 1·75—3·25 cm. alta; bulbus ovatus vel ellipticus, sensim apicem versus attenuatus, squamis rubro-brunneis, tenuibus, laevibus ornatus, 1·2—2·1 cm. longus, 0·45—0·9 cm. latus; caulis paullo exsertus, puberulus, uno vel pluribus squamis late ovatis, acutis praeditus; folia 3-foliolata, petiolis puberulis, basi late dilatatis, 0·2—0·4 cm. longis, foliolis lineari-oblongis, oblongis vel ovalibus, falcatis, subemarginatis, superne glabris, inferne puberulis, apicem infra et nervo medio utrinque rubro-callosis, 0·1—0·25 cm. longis, 0·075—0·1 cm. latis; pedunculus 1-fl., 0·2—0·9 cm. longus, puberulus, bibracteolatus saepissime paullo apicem infra, bracteolis oppositis vel alternis, apicem infra bicallosis, ciliatis; calyx 0·2—0·3 cm. longus, segmentis lineari-lanceolatis, acutis, glabris vel pauce puberulis, ciliatis, apice bicallosis, purpureo-marginatis; corolla infundibuliformis, glabra, faucem infra longitudinaliter purpureoque 5-lineata, 0·9—1·1 cm. longa, petalorum lamina apice rotundata, lilacina dilute; filamenta glabra, interiora edentata; ovarium tertio inferiore glabrum, superne, densius ad apicem, pilosum, 0·17 cm. longum, stylis glabris.

Cape Province: Karroo Region; Worcester Div., near Matjesfontein, 2960 ft., fl. May, *F. Bolus* (Bolus Herb. No. 13381).

Nearest to *O. polytricha*, Sond., but differs in the indument of the leaflets and in the shorter petioles and corolla.

O. Annae, Bol. f., *O. imbricatae* var. β accedit sed foliolis minoribus, polymorphis, utrinque conspicue punctatis, minus pilosis, corolla externe pilosa, calyce minus piloso, segmentis obtusis, et filamentis interioribus edentatis.

Herba 1·75—3·75 cm. alta; bulbi atro-brunnei, plurimi, approximati, superpositi, ad 1·3 cm. diam., tunicis imbricatis, recentioribus vetustiores partim obtegentibus, longitudinaliter tenue punctatis, nonnunquam supremis laxis, dilute brunneis; caulis non exsertus; folia 3-foliolata, petiolis cum pedunculis parce patenti-pilosis vel subglabris, 0·8—2 cm. longis, basi late dilatatis, foliolis polymorphis, obcordatis vel obcordato-bilobis, ad basin nonnunquam cuneatis, utrinque conspicue punctatis, petiolulatis, glabris, vel infra parce pilosis, pilis mollibus patentibusque, tenue distanterque ciliatis, pilis satis longis, mollibus, 0·3—0·55 cm. longis, 0·25—0·4 cm. latis; pedunculi 0·6—1·1 cm. longi, dimidio superiore bibracteolati, bracteolis oppositis, glabris; calyx 0·35—0·4 cm. longus, segmentis ovato-ellipticis, obtusis, apice pilosis, ciliatis; corolla infundibuliformis, tubo piloso, 1·4—1·8 cm. longa, petalorum lamina apice rotundata, externe marginibus apiceque pilosa, purpurea; filamenta glabra, interioribus edentatis;

ovarium dimidio superiore pilosum, 0·2 cm. longum, stylis parcissime minuteque puberulis.

Cape Province: Karroo or South-Western Region; Prince Albert Div., near Prince Albert or on the Zwartberg, fl. July, *A. M. Tugwell* (Bolus Herb. No. 13379).

Nearest to *O. imbricata*, E. and Z., var. *β*, from which it is distinguished by the smaller and polymorphic leaflets, which are conspicuously punctate on each side and less hairy, the externally pilose corolla, the less hairy calyx with obtuse segments, and by the inner stamens being toothless.

O. petiolulata, Bol. f., *O. decipienti* accedit sed foliolis conspicue petiolulatis, pagina inferiore nigro-callosis, callis una serie circum marginem dispositis differt.

Herba 3·2—4·7 cm. alta; bulbus nec visus; caulis non exsertus, dense foliosus; folia 3-foliolata, petiolis glabris, 0·7—1·5 cm. longis, foliolis subrotundatis, mediis subacutis vel obtusis, lateralibus apice rotundatis, petiolulatis, petiolulis ad 0·1 cm. longis, supra glabris, minute punctatis, infra manifeste punctatis, nigro-callosis, callis una serie circum marginem dispositis, 0·3—0·6 cm. longis, 0·2—0·6 cm. latis; pedunculi 1-fl., glabri, ebracteolati, 0·6—2·2 cm. longi; calyx 0·35—0·5 cm. longus, segmentis oblongo-linearibus, subacutis, apicem infra bicallosis, callis subpurpureis, breviter ciliatis, praecipue dimidio superiore; corolla infundibuliformis, glabra, 2—2·3 cm. longa, petalorum lamina obovata, apice rotundata, purpurea; filamenta glabra; ovarium supra medium pilosum, 0·2 cm. longum, stylis infra medium pilosis, superne glabris.

Cape Province: South-Western Region; Clanwilliam div. near Wupperthal, 1700 ft., and near Krakadouw, 3000 ft., fl. Oct., *H. Bolus*, 8952.

Nearest *O. decipiens*, Schltr., but differs in the leaflets being very conspicuously petiolulate, and in the calli on the undersurface of the leaflets being confined to a marginal border.

O. Maderi, Bol. f., *O. Meyeri* accedit sed foliolis non obovatis, petiolis longioribus, corolla splendide flava differt.

Herba 16 cm. alta, pilosa, pilis longis, pluri-cellularibus, pellucidis, albis; bulbus non visus; caulis non vel vix exsertus; folia 3-foliolata, petiolis 4·5—14 cm. longis, foliolis oblongo-ovalibus, obtusis, utrinque nervis prominentibus, medio nervo marginibusque interdum basin versus parcissime pilosis, aliter glabris, 1·4—3·2 cm. longis, 0·65—1·5 cm. latis; pedunculi 1-fl., 12·5 cm. longi, dimidio superiore bibracteolati, bracteolis alternis vel oppositis, 0·8 cm. longis; calyx 1 cm. longus, segmentis lineari-lanceolatis, acuminatis, pilosis ciliatisque; corolla subinfundibuliformis, glabra, splendide flava, 2·7 cm. longa, fauce circa 0·75 cm. diam., apice circa 1·2 cm. diam.; filamenta dimidio superiore parce puberula, interiore carinata, interioribus dentatis, dente lato rotundatoque; ovarium glabrum, 0·4 cm. longum, stylis dimidio superiore parce puberulis.

Cape Province: South-Western Region; Clanwilliam Div. near Clanwilliam, *P. A. Mader*, 2141.

Allied to *O. Meyeri*, Sond. in the § Xanthotrichae, but differs in the leaflets not being obovate, in the longer petioles, and in the beautiful yellow corolla.

Mesembrianthemum Wilmaniae, L. Bolus (*Ficoideae-Mesembrieae*). Epapillosum subacaulescens, radice tuberoso, ramis dense 8—10-foliatis, foliis basi connatis, 3-quetris acutis, floribus solitariis, brevissime pedunculatis, 5-meris, petalis dilute roseis, stylis subulatis setaceo-acuminatis.

Glabrum, radice 1·5 cm. diam.; folia patenti-erecta, altero subfalcato, carina leviter excentrica, glauco-viridia, apicem versus rosea, ubique dense punctata, punctis parvis, sature viridibus, 3—4 cm. longa, basi 0·8—1 cm. lata, 0·7—0·9 cm. diam.; pedunculus basi 2-bracteatus, bracteis 1·2 cm. longis; calyx clavatus subcompressus, segmentis inter se fere aequalibus, lanceolato-subulatis acuminatis, interioribus anguste membranaceo-marginatis, 0·8—1 cm. longis, basi 0·4—0·6 cm. latis; petala 2—3-seriata subaequilonga vel pauca intima breviora, linearia, basi paullo attenuata, obtusa, 1·7—1·9 cm. longa, 0·2—0·25 cm. lata; staminodia cum staminibus collecta, apice patentia, acuminata, inferne albida, superne straminea, ad 1 cm. longa; stamina 6—7-seriata, filamentis omnibus barbatis, 0·4—1 cm. longa; glandulae parvae atrovirides; ovarium convexum 5-lobatum, 0·4 cm. diam.; styli erecti, 0·5 cm. longi, basi 0·15 cm. lati.

Griqualand West: Kalahari Region; Hay Div., Papkuil, fl. Aug., *G. L. Lawson*. Exact locality uncertain, *Maria Wilman*. Flowered in the National Botanic Gardens, Kirstenbosch, June 1915, No. $\frac{3784}{14}$.

Epapillose subacaulescent; root tuberous; branches 8—10-leaved; leaves crowded, connate at base, 3-quetrous acute; flowers solitary, very shortly pedunculate, 5-merous; petals pale rose pink; styles subulate, setaceously acuminate.

M. opulentum, L. Bolus. Epapillosum caulescens, foliis breviter connatis erectis, apice uncinatis, 3-quetris, floribus 3-natis 5-meris, pedunculis omnibus bracteatis, calycis segmentis subaequalibus, petalis roseo-purpureis, stylis gracilibus.

Fruticulus glaber, ramis decumbentibus, ramulis floriferis erectis; folia conspicue punctata, punctis crebris, 0·5—0·6 cm. longa, 0·2 cm.

diam. lataque, internodiis 0·5—1 cm. longis vel ultra; pedunculi graciles, parum infra medium bracteati, 0·8—1 cm. longi; flores copiosi, 1 cm. diam.; calyx turbinatus, segmentis lanceolatis vel ovato-lanceolatis, 0·25 cm. longis; petala 1—2 seriata subaequalia lineari-spathulata, obtusa vel 2-dentata, inconspicue vittata; stamina staminodiaque collecta, filamentis purpureis, supra basin purpureo-barbatis, antheris albis; discus annularis, brevissimus; ovarium supra planum, 0·2 cm. diam., stylis erectis, 0·1—0·15 cm. longis.

Cape Province: South-Western Region; Riversdale, *E. Smalbegu.* Flowered in the National Botanic Gardens, Kirstenbosch, June 1915, No. $\frac{4574}{14}$.

Epapillose, caulescent; leaves shortly connate erect, recurved-hooked at the apex, 3-quetrous; flowers 3-nate 5-merous, all the peduncles bracteate; calyx-segments subequal; petals rose-purple; styles slender.

M. caudatum, L. Bolus (§ *Spinulifera*). Papillosum caulescens herbaceum, radice tuberoso, foliis semi-teretibus acutis, supra canaliculatis, floribus solitariis 5-meris, inter majores generis, calycis segmentis conspicue caudato-elongatis, petalis extus stramineis intus flavis, staminibus exterioribus radiantibus, stylis subulatis setaceo-acuminatis.

Rami decumbentes, ad 9 cm. longi, internodiis 0·5—1 cm. longis; folia saepissime alterna, 4—9 cm. longa, 0·3 cm. diam.; flores 5—6 cm. diam., pedunculis ascendenti-erectis, 5—6 cm. longis; calyx turbinatus, segmentis ovatis, in caudas foliaceas productis, 2·5—6 cm. longis; petala pluri-seriata, 1·5—2·5 cm. longa, exteriores breviores; stamina staminodiaque pluri-seriata, 0·3—1·5 cm. longa; ovarium conicum, obscure 5-angulatum, stylis 5, erecto-patentibus, 0·5 cm. longis.

Cape Province: South-Western Region; Worcester Div., Orchard Siding, Hex River Valley, *N. S. Pillans*, 1673; fl. Aug., *F. A. Rogers*, 16414.

Papillose caulescent herbaceous; root tuberous; leaves semi-terete acute, channelled above; flowers solitary 5-merous, among the large ones in the genus; calyx segments conspicuously long-tailed; petals yellow; stamens spreading; styles subulate, setaceously acuminate.

M. hamatum, L. Bolus, *M. rigido* affine sed foliis adscendentibus vel fere erectis, turgide triquetris angulis laevibus, filamentis petalisque purpureis differt.

Frutex robustus glaber, ad 0·3 met. altus, caule basi ad 2·5 cm. diam., ramosus, ramis patentibus rigidis, cortice brunneo vestitis, ad 1·2 cm. diam.; folia breviter vaginantia, saepissime fere erecta, apice recurva subtruncata mucronulata, supra plana, carina obscura, prominenter punctata, punctis pellucidis, 0·4—0·7 cm. longa, ad 0·2 cm. diam.; flores solitarii subsessiles, pedunculo foliis supremis aequilongo vel breviore, 1·2 cm. diam.; calyx clavatus, segmentis subaequilongis, tribus membranaceo-marginatis, 0·3 cm. longis; petala 2-seriata linearia, apicem versus parum ampliata, acuta, 0·5 cm. longa, apice vix 0·1 cm. lata; stamina collecta, antheris albidis; discus annularis crenulatus, sature viridis; ovarium supra convexum 5-lobum, stylis lineari-subulatis, stamina superantibus, 0·2—0·3 cm. longis.

Var. β, decumbens—caule abbreviato, ramis elongatis decumbentibus, foliis floribusque parum majoribus.

Cape Province: Kalahari Region; near Kimberley, Wimbledon Ridge, fl. Oct.—Nov., *J. C. Moran* (Bolus Herb. No. 13898). Between Kuruman and Vaal R., *J. Cruickshank* (Bolus Herb. No. 2520). Var. β: Orange Free State; nr Bloemfontein, alt. 4500 ft., fl. Feb., *H. Bolus*, 11089. Smithfield, *Dr Schonken*. Flowered in the National Botanic Gardens, Kirstenbosch, Nov. 1915, No. $\frac{4289}{14}$. Transvaal: Heidelberg, fl. Nov., *R. Leendertz*, 2460. Nr Bloemhof, *W. Roe* (Bolus Herb. No. 13484).

Near *M. rigidum*, Haw., but differs in having ascending or almost erect, turgidly triquetrous leaves with smooth angles, and purple petals and filaments.

M. Capornii, L. Bolus. Epapillosum caulescens, foliis basi connatis, turgide 3-quetris obtusissimis, floribus ternatis vel bi-ternatis, 5-meris, petalis roseo-purpureis, stylis gracillimis elongatis.

Fruticulus erectus glaber; rami graciles subteretes; folia ad 1 cm. longa, 0·4 cm. diam. lataque; flores copiosi, in cymas ramos breves laterales terminantes dispositi, 0·9 cm. diam.; calycis segmenta subaequalia lanceolata plana subacuta, 0·3 cm. longa; petala 1—2-seriata, vix 0·4 cm. longa; stamina 2-seriata conferta, filamentis medio barbatis, infra albis, supra purpureis, antheris albis; discus annularis denticulatus, sature viridis; ovarium supra convexum, 0·2 cm. diam., stylis erectis lineari-subulatis capillaceo-acuminatis, 0·3 cm. longis.

Cape Province: Western Region; Namaqualand, Garies, *A. St Clair Caporn*. Flowered in the National Botanic Gardens, Kirstenbosch, July 1915, No. $\frac{822}{15}$.

Epapillose caulescent; leaves connate at base, turgidly 3-quetrous, very obtuse; flowers ternate or bi-ternate, 5-merous; petals rose-purple; styles very slender, elongate.

M. Patersoniae, L. Bolus. Epapillosum caulescens, foliis 3-quetris, ima basi connatis, compressis pubescentibus, floribus 5-meris, calycis segmentis subaequilongis, petalis albidis, staminibus confertis, stylis crassis, brevibus.

Fruticulus humilis ramosus, ramis subcompressis pubescentibus, demum glabris; folia subfalcata recurvo-mucronulata, carina compressa dilatataque, marginibus integris ciliolatis, ad 1·8 cm. longa, 0·5—0·7 cm. lata, 0·6—0·8 cm. diam.; flores 3-nati vel solitarii, breviter pedunculati, pedunculo foliis supremis aequilongo vel breviore, 1·5 cm. diam.; calyx obtuse 5-angularis, segmentis subaequilongis, exterioribus crassis carinatis obtusis, duobus interioribus late membranaceo-marginatis, 0·5 cm. longis; petala 3—4-seriata, acuta vel obtusa, albida, apicem versus pallide rosea, exteriora 0·7 cm. longa, 0·1 cm. lata, interiora multo angustiora; filamenta albida, antheris luteis; glandulae disci distantes atro-virides; ovarium supra convexum, conspicue 5-lobum; styli erecti ovati, 0·1 cm. longis.

Cape Province: South-Eastern Region; Uitenhage Div.; Schoenmaker's Kop, nr Port Elizabeth, fl. July, *Florence Paterson*, 2288. Flowered in the National Botanic Gardens, Kirstenbosch, Oct. 1915, No. $\frac{5136}{14}$.

Epapillose caulescent, leaves 3-quetrous, connate at the very base, compressed pubescent, flowers 5-merous, calyx segments subequal in length, petals whitish, stamens collected, styles thick and short.

M. Frederici, L. Bolus. Epapillosum caulescens, foliis basi connatis, semiteretibus, abrupte acutis, subfalcatis laevibus, calycis segmentis subaequalibus, petalis purpureis, staminibus confertis, stylis lineari-subulatis acuminatis.

Fruticulus ramosus glaberrimus, ramis patentibus, ramulis adscendentibus vel erectis, fere teretibus vel junioribus compressis, internodiis 3—4·5 cm. longis; folia subglauca, ad 2 cm. longa, 0·3 cm. diam. lataque; flores 3-nati vel abortione solitarii, 1·3—1·7 cm. diam., pedunculis omnibus bracteatis, 1—2 cm. longis; calyx turbinatus, segmentis subaequalibus lanceolatis vel lanceolato-ovatis acutis, tribus anguste membranaceo-marginatis, 0·3—0·4 cm. longis; petala biseriata, fere aequilonga, lineari-spathulata subobtusa, ad 0·7 cm. longa; filamenta basin versus albidis, superne purpureis, antheris albidis; discus annularis crenatus; ovarium convexum, stylis 0·2 cm. longis.

Cape Province: South-Western Region; Hex River Valley, Orchard Siding, fl. Aug., *F. A. Rogers*, 16417.

Epapillose caulescent, leaves connate at base, semi-terete, suddenly acute, subfalcate smooth, calyx-segments subequal, petals purple, stamens collected, styles linear-subulate acuminate.

Polystachya Hollandii, L. Bolus (*Orchideae-Vandeae-Cymbidieae*). Glabra, pseudobulbis nullis, caulibus 1-foliatis, foliis anguste linearibus attenuatis mucronatis; pedunculis 2—3-fl., floribus 0·6 cm. longis, labello 3-lobato, lobis obtusissimis.

Caules aggregati, basi 2—4-vaginati, vaginis ad 2 cm. longis; folia erecta, supra canaliculata, nervo medio impresso, dorso convexa vel inconspicuissime carinata, laete viridia, subcoriacea, ad 6 cm. longa, basi vix 0·4 cm. lata; pedunculi gracillimi, foliis breviores; bracteae cuspidatae, 0·1—0·2 cm. longae; sepalum impar oblongum acutum, lateralibus oblique late ovatis, acutissimis, 0·6 cm. longis; petala subspathulata, sepalis aequilonga; labellum breviter unguiculatum, circuitu transverse oblongum, 1 cm. latum, sepalis aequilongum, margine crenulatum, lobo medio lateralibus fere duplo latiore, parumque longiore, 0·2 cm. longo; columna superne gradatim ampliata, 0·4 cm. longa.

Tropical Africa: Southern Rhodesia; Umtali, *B. H. Holland.* Flowered in the National Botanic Gardens, Kirstenbosch, May—June 1915, No. $\frac{734}{14}$.

Glabrous, without pseudobulbs, stems 1-leaved, leaves narrow-linear attenuate mucronate; peduncles 2—3-fld., fls. 0·6 cm. long, lip 3-lobed, lobes very obtuse.

Disa Pillansii, L. Bolus, sepalo impari antico fornicato, ore lineari vel oblongo-lineari.

Herba erecta, 20 cm. alta; caulis substrictus, ad 0·2 cm. diam., basi 5-foliatus, sursum 4-vaginatus; folia erecto-patentia oblongo-spathulata acuta subcoriacea, ad 4 cm. longa, 1 cm. lata; vaginae acuminatae, 2·5 cm. longae; bracteae ovariis aequilongae, 1—1·5 cm. longae; flores 6 adscendentes subcapitati, demum spicati; sepala lateralia patentia concava ovali-oblonga obtusa, apicem infra apiculata, carinata, 1—1·4 cm. longa; sepalum impar erectum, dorso obscure gibbosum, 0·8—1 cm. longum; petala erecta, margine posteriore columnae adnata, oblonga, basin versus leviter angustata, apice obliqua subcucullata, 0·5 cm. longa; labellum anguste lineare, petalis aequilongum; anthera adscendens; rostellum oblongum, 0·2 cm. longum, lobo medio reflexo.

Cape Province: South-Western Region; Hottentots' Holland Mts., nr Sir Lowry's Pass, fl. Sep.—Oct., *N. S. Pillans*, 2675.

The fornicate odd sepal with a remarkably narrow mouth distinguishes this species from all the other Disae. In general appearance it resembles *D. falcata*, Schltr., from which, however, it differs also in having the odd sepal anticous and not spurred.

Dr J. Medley Wood

JOHN MEDLEY WOOD

John Medley Wood was born at Mansfield, Nottinghamshire, on December 1st, 1827, and died at Durban on August 26th, 1915, thus having reached the great age of 88. During his long life he had extraordinary health and strength, being able to do his daily work in all this time without any break. His long uninterrupted residence in Natal and his love for his adopted land made him essentially a Natalian and this is not surprising as, from the time he landed at The Point sixty years ago in 1852 until 1915, he only left Natal for three short periods. Indeed I think that latterly he made it a point of pride that Natal should be his land and gloried that he had been so steadfast to the country of his adoption.

In his early days he followed the sea and only when his father came to Natal did he decide to leave it and settle in what was then an almost unknown part of Africa. At first he assisted his father in his duties of Sheriff of Natal but a little later he married the partner of his long life, Miss Haygarth, and began as a pioneer planter at Otterspool near the mouth of the Umhloti river. Here he was in his element. Always a lover and student of plants he not only observed and collected the native flora but experimented with the economic plants which in those days promised so much in Natal and gave such an interest to the lives of the pioneers. He grew arrowroot, coffee, sugar cane, tobacco and the tropical fruits, making many mistakes but helping to increase knowledge by his experiments.

Arrowroot failed by reason of the restricted market. Coffee was attacked by *Hemileia vastatrix* but the cultivation and final success of sugar was largely due to the educated interest of our old friend. The more succulent varieties of cane had not been an unqualified success and he found among certain imported specimens a hardier variety known as Ubacane and which is now the basis of the sugar production of Natal. Whilst living at Otterspool our friend, like many of the early settlers on the North Coast between the Umgeni and Tugela rivers, made trading expeditions over the last named river into Zululand. Native carriers were engaged who carried the stock in trade of blankets, picks and beads, and the trader went from kraal to kraal exchanging these goods for the cattle of the country, returning to Natal and selling the cattle to the Natal natives for the cash they had earned while working for the Colonists. This trading was not without its hazards. On one occasion when 'MPanda was in a killing mood refugees ran to the camp of our friend followed by an impi of the King and only by tactful conduct in the first place and rapid flight in the second did the party escape serious consequences.

The immediate neighbourhood of the coast was extremely hot and in those days not very healthy, so Mr and Mrs Wood decided to move to the uplands of the Inanda some 20 miles inland and about 2000 feet above the sea. It was here about 1876 that I first made the friendship that was to last nearly 40 years. It was only a short time after my arrival in Natal that, deeply interested in all such a new country could show me, I went up to the Inanda. It was a delightful experience full of novel sensations and not the least of its delights was meeting Mr and Mrs Wood. At that time Mr Wood had about finished collecting and classifying, along with the Rev. John Buchanan, the ferns of Natal and was entering the wider field of flowering plants. He had a store for native trade at Inanda and another further into the location at Itafami and beyond the Itafamasi was the wild rugged Noodsberg escarpment facing the sea at a height of 3500 ft. The home at Inanda was a most delightful place surrounded by wild scenery and yet with an open view of the Indian Ocean, blessed with a lovely climate seldom too hot and yet frost free. A visit there was a true rest yet full of vivid interest in plants, natives, scenery, traditions of old Natal and Zululand. But Mr Wood was not to remain in this ideally restful spot. His investigations into plant life and his collections including many new species exchanged with Kew and other European herbaria brought his name more and more into notice. The Committee of the Durban Botanic Society were indebted to him for much help and advice and 33 years ago asked him to undertake the management of the Gardens. He agreed but stipulated that he must be allowed to establish a Herbarium and he generously gave his whole valuable collection as a nucleus. From that time Dr Wood's life has been that of the Gardens and Herbarium. It was a labour of love—he had found his life work. Systematic Botany was much to him and his name will ever be associated with the plants of the land he loved so well. But more in the lovely gardens which are such a feature of the Berea may be seen the results of his work in tree, shrub and flower, for many of those beautifying this lovely spot have been introduced by him.

Of Dr Wood's special work for Botany, three-eighths of his publications, I need not speak. Those who read this journal will know of these, but I would briefly speak of the man. Dr and Mrs Wood had no children of their own but he was devoted to young people and ever at home among them. He had numerous relations and kept in regular touch with them and the young had always a home at the Gardens.

He had a wonderful memory not only for plants and plant names but for the ordinary affairs of life. It was a great pleasure to listen to his reminiscences of Early Natal and Zululand, the people and stories of their lives. And from what I have seen and heard I should say that in Natal of the fifties to the seventies of last century there was a larger proportion of oddities and unusual characters, fine and otherwise, than fall to many larger communities. I often told my friend that he should embody and fix these recollections in book form. It would have been of entrancing interest to my generation and the next but he said that writing about plants was sufficient demand on his literary capacity.

The married life of my two old friends was of the happiest and when Mrs Wood who was slightly his senior passed away about three years ago we feared it might so affect him that he would quickly follow her. He bore his sorrow with characteristic bravery but we never knew what a trial it was. When he received his Doctor's degree at the University of the Cape of Good Hope he said pathetically indeed that this would have intensely pleased his wife. Now we trust they are reunited.

His physical powers were of a high order. In his youth he took much exercise and in particular I know from my own experience what a wonderful walker he was. Getting older he had to circumscribe his activities but to the last he took the keenest interest in football and cricket and seldom missed a Saturday afternoon at the Oval where he was as well known as the active participants.

He was a regular Church goer and an office bearer of the Berea Presbyterian Church but he belonged to the Church Catholic, frequently attending service at the Church of England and other denominations if he felt he could benefit thereby.

His death came suddenly and painlessly and he was working to the last day.

We shall miss him, but our sorrow is not unmixed with other emotions. Many pleasant memories cluster round his name. He had a happy and useful life devoted to a study that gave him intense pleasure and constant delight, yet full of human interest also. A man of the highest character, upright, fearing only to do the wrong, he has been a stimulus and guide to many and his name will live in the future in connection with the study to which his life was devoted and the country he loved so well.

MAURICE S. EVANS.

The record of Dr J. Medley Wood's contributions to botanical science is practically identical with the history of Botany in Natal up to a comparatively recent date. His earliest important work was the *Preliminary Catalogue of Indigenous Natal Plants* which he published in 1894. It contained the names of 2216 species belonging to 828 genera, and in addition 391 varieties or unnamed species, comprising the results of a long period of work. Up to that time, it was impossible to obtain much definite information regarding the distribution or relative abundance of such Natal plants as had been described.

As Medley Wood remarked in his preface, many collectors had been content to give the locality as simply Natal or to add the name of some river, such as Umzimkulu, Tugela, etc.; but as these rivers run their course from the Drakensberg to the sea, it was impossible to form any idea of the exact localities. The collections of Gerrard and Buchanan were all without any indication of habitat. Medley Wood set himself to remedy this and success attended his efforts. Gradually a large amount of exact information was accumulated and also the number of discovered species—many of them new to science—was rapidly increased.

In 1907, he published a *Handbook to the Flora of Natal,* containing 907 genera, 3447 species and 83 varieties with analytical keys to the genera. Still later, in his *Revised list of the Flora of Natal,* to which two separate Appendices were afterwards added, he still further increased the list and in addition gave much useful information regarding distribution. Medley Wood's activity was not confined to the mere extending of the list of records and the discovery of new species. He enriched the Government Herbarium at Durban and other Herbaria all over the world by the exchange of specimens, and the large amount of work entailed he carried out practically single-handed. He further undertook the work of making the Flora of Natal better known to the people of Natal itself and to the outside world by the publication of his *Natal Plants,* which he continued issuing up to the time of his death. Six volumes appeared, each containing 100 species with every species beautifully illustrated. Vols. II and V almost exhaust the grasses of Natal. A list of the Ferns of Natal, and various *Reports* from the Durban Botanic Gardens, should also be included among his publications.

It is difficult to estimate, in such a brief sketch as this, the value of Medley Wood's life's work. It was his privilege to work in a virgin field and he took advantage of the many opportunities and at the same time nobly overcame the still more numerous difficulties. For those of us who have to follow him, he has made the path much easier and has given us a firm foundation on which to build, and we gratefully acknowledge our indebtedness to him.

J. W. BEWS.

REVIEWS

BOTANY FOR SENIOR STUDENTS. By D. Thoday. *Cambridge University Press.* 5*s.* 6*d.*

This book is intended primarily for use in schools preparing for the Senior Cambridge Local Examination in Botany, but as the syllabus for this covers much the same ground as that for the Cape Matriculation (except for the Natural Orders), it should be just as useful in High Schools in this country. In fact, it seems to fill the long-felt want of a botanical text-book for Standards D and E, as far, that is, as can be done by any book written outside the country. Placed in the hands of students in those classes, it would save much time now spent in the giving of "notes," as the structure and functions of the plant organs are clearly and simply explained, the necessary minimum of chemistry and physics is supplied, and no previous knowledge of the subject is assumed.

It is to be wished however that in the section devoted to Plant Physiology simpler experiments had been substituted for some of those given—experiments that could be carried out by the scholars themselves—and also that more precise directions had been given for the setting up of the experiments. A solitary student not accustomed to the manufacture of gases and the use of apparatus generally would become bewildered and disheartened in trying to carry out some of these experiments, and would probably descend to learning off the accounts of them by heart instead of trying to perform them himself. In the hands of a capable teacher however this section will be of value as a text, as the writer has paid special attention to various matters which experience as an examiner has convinced him are widely misunderstood or imperfectly grasped. Similar experience has shown the reviewer that the difficulties he dwells on are particular stumbling-blocks to South African students, and one feels that a study of Mr Thoday's clear and careful explanations would go a long way towards removing them. A chapter is devoted to the balance between absorption and transpiration and adaptations to xerophytic conditions, so important in this country. In the section on Plant Structure, there are some refreshingly new diagrams of the Sunflower stem, and teachers will be pleased to find explanations of the structure of the beetroot and other domestic vegetables, about which students are liable to ask awkward questions. In the descriptions of the Natural Orders, a special feature is made of longitudinal sections of flowers, which convey much more to young students than the usual ground-plan floral diagram.

E. L. STEPHENS.

THE FERNS OF SOUTH AFRICA. By Thomas R. Sim. 2nd Edition. *Cambridge University Press.* 1915.

When the history of South African Botany comes to be written, the name of T. R. Sim will find an honoured place therein. His *Forests and Forest Flora of Cape Colony, Forest Flora and Forest Resources of Portuguese E. Africa, Ferns of S. Africa,* to mention only two or three of his numerous works, leave us deeply impressed by his wonderful energy and ability, and now, by the publication of a second edition of his *Ferns,* he has increased the debt which botanical science in S. Africa owes him.

The introductory chapters possess an agreeable freshness of outlook and contain all that is necessary in a systematic work of this description, without entering into too great morphological detail. The sections dealing with the cultivation of S. African Ferns and the natural home of the Ferns should make the book appeal to a wider circle of readers.

The arrangement and nomenclature followed is mainly that of Carl Christensen's *Index Filicum,* but Bower's arrangement is adopted for the cohorts of Pteridophyta not dealt with by Christensen. It must be admitted that, in spite of the importance of recent researches by Bower and others, we are still a long way from a truly natural scheme of classification and that adopted by Mr Sim is probably the most serviceable yet devised. The descriptions of the species occupy the main portion of the book, and for this section we have nothing but praise. Exceptionally full reference is made to previous writers, a task in itself of no small magnitude, especially for one working in S. Africa; in fact, the paragraphs in which the historical matter is discussed are not the least valuable in the work. For all the critical species, however, Sim prefers to trust his own judgment and, as he states in the preface, he has found occasion in a good many cases to differ from Kuhn, mostly regarding species originated by Pappe and Rawson. The whole of the descriptions, as well as the figures, are Sim's own, taken from live specimens where these were obtainable, or from dried specimens in his own herbarium or in some of the leading Cape herbaria. Every species is figured and the drawings are admirable examples of scientific clearness and accuracy.

Generous acknowledgment is made to numerous botanists and collectors and the records of localities are as full as they can be made. This, together with the information given in a separate chapter on distribution, will form an exceptionally useful basis for further work from the phytogeographical standpoint. The appearance of the book is sure to lead to an increased interest in the group and further collecting and recording. It is a work which is indispensable to all interested in S. African plant life from whatever standpoint. The cost of producing a book of this description, with 186 plates, has doubtless been considerable and the author states that he is especially indebted to the Witwatersrand Council of Education, the Education departments of Cape Colony and Natal, the Hon. Marshall Campbell and others for financial assistance.

In conclusion, a brief summary may be given of the main points in which this second edition differs from the first, since this is in effect a record of the progress made in the study of South African Pteridophyta since 1892.

In the first place, botanical nomenclature has now adopted fixed principles and this has involved changes far too numerous to mention here. The area dealt with has been extended to include the whole of S. Africa south of the Zambesi, instead of that south of the Tropic of Capricorn. The list of records from the Northern Colonies has been greatly increased and, as a result, the present edition enumerates 220 species as compared with 179 in the first edition. At the same time, Sim's thorough and accurate knowledge of the species as they grow under natural conditions, has enabled him to reduce from specific rank many of the forms hitherto regarded as good species. He has ventured even to delete several species, which were retained by Christensen in his *Index Filicum* as S. African. Whenever any doubt exists, however, the species have been retained. The following new species are described:—*Hymenophyllum uncinatum, Asplenium Eylesii, A. Hollandi, Pellaea Swynnertoniana, Notholaena bipinnata, Isoetes Wormaldii*, the last mentioned an interesting form, with leaves nine to eighteen inches long.

J. W. BEWS.

INDISCH NATUURONDERZOEK. By Dr M. J. SIRKS. pp. xi + 303. Price $4.25. Koloniaal Instituut te Amsterdam. Mededeeling, No. VI. Afdeeling Handelsmuseum, No. 2.

This volume contains an interesting sketch of the history of the development of natural science in the Dutch East Indies from the beginning of the seventeenth century onwards. To botanists the most interesting chapters are those dealing with the life and work of the botanical writers of the seventeenth century and the rise and growth of the world-famed botanic garden of Buitenzorg.

The book is embellished with portraits of eminent men who figure in the scientific history of the Dutch East Indies, and includes an extensive bibliography.

METHODS IN PLANT HISTOLOGY. By Charles J. Chamberlain, A.M., Ph.D. Third revised Edition. *The University of Chicago Press.* 1915.

The third edition of this well known work retains the excellent features of those which have preceded it and includes much new matter which considerably enhances its value. As a general guide to the use of the laboratory methods employed in modern morphological and cytological investigations it is very comprehensive and thoroughly reliable.

Features of the new edition are a description of Klebs' methods of investigating the life histories of Thallophyta, and new chapters on microchemical tests, free hand sections and the use of the microscope. Considerable stress is laid upon methods of fixing, staining and preparing material for the use of the microtome.

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ON THE SOUTH AFRICAN SPECIES OF *CRASSULA*, LINN., SECT. *TILLAEOIDEAE*, SCHÖNL.

BY S. SCHÖNLAND[1].

(*With* 16 *figures in the text and* 6 *plates.*)

A. P. DE CANDOLLE was the first to create a section *Tillaeoideae* in the genus *Crassula* [Mémoire sur la famille des *Crassulacées*, Paris, 1828, 18, Prodr. III (1828), 389]. He characterised them as small herbs with the habit of *Tillaea,* with 4-merous flowers but with multiseeded follicles, and to it belong according to him all species of *Tillaea* from the Cape described by Thunberg as *Crassula natans, inanis, umbellata* et *decumbens.* He put into a special section annual dichotomous herbs which in habit resemble *Scleranthus* and have small whitish flowers, disposed in corymbiform cymes. He called this section "*Glomeratae*" (as Haworth in Rev. Pl. Succ. 1821, 12, had done before him) and placed into it *Cr. glomerata, glabra,* etc.

He keeps up the Linnean genus *Tillaea* (originally established by Micheli). According to him this genus comprises very small species of *Crassulaceae* which grow in damp places, have entire and decussate leaves, with mostly 3-merous flowers (though sometimes with 4-merous and 5-merous flowers). Their most important character is, however, found in the fact that the ovaries are only 2-ovuled and that perhaps the nectar-scales are entirely absent. At the time of writing this account he could only refer to this genus with certainty *T. muscosa,* L. and *T. rubescens,* Kunth, and a new species, *T. verticillaris.*

He further keeps up the genus *Bulliarda,* first conceived by L'Héritier and published by De Candolle in the Pl. Grasses, t. 74, and elsewhere. He only quotes as a distinguishing character from *Tillaea* its multi-seeded follicles, and from *Crassula* its linear nectar-scales. Some subsequent authors (such as Harvey in Flora Capensis, II, 329) have paid little attention to these distinctions and proceeded in the delimitation of these genera on their own lines, and it is hardly worth while to follow their vagaries.

I must, however, refer to Ecklon and Zeyher's attitude in this matter. In their "Enumeratio Plantarum," Hamburg, 1836, 288, they establish a new genus *Helophytum* which according to them (leaving out unimportant details) is characterised by 4-merous flowers, in which the calyx is shorter than the corolla, and which have free petals, 4-ovuled carpels, cuneate (truncate at the top) and rather large nectar-scales. This genus includes *Cr. natans,* Thunb. and *Cr. inanis,* Thunb. It was kept up by Harvey (l.c., 328) who corrected an unfortunate mistake of the authors (previously committed by De Candolle) and rightly stated that the ovules are solitary in the carpels. Ecklon and Zeyher further established the genus *Sarcolipes* (l.c., anno 1837, 290) which has 5-merous flowers, multi-ovuled carpels and linear nectar scales. To this belongs only the species named later by Harvey *Cr. Sarcolipes,* Harv. Amongst their genus *Petrogeton* (l.c., 391), which includes the plants placed by Harvey under his *Crenato-lobatae,* we find their *Petrogeton alpinum* placed by Harvey under *Bulliarda* (l.c., 330). It is almost certainly identical with *Cr. umbellata,* Thunb.

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[1] Contribution from the Herbarium of the Albany Museum, Grahamstown.

Their genus *Thisantha* (l.c., 302) includes *glomerata,* L. and allied species with 5-merous flowers and 1—2-ovuled ovaries. They erroneously assume that these species lack nectar-scales.

Lastly (as far as our part of the subject is concerned), they established the genus *Tetraphyle* (l.c., anno 1837, 292) which includes a great mixture, as it is chiefly founded on the habit induced by the 4-ranked imbricate leaves. They all have 5-merous flowers, but as some of the most important characters, such as multi-ovuled carpels, do not apply to some of the species here placed, we will not concern ourselves further with the genus.

It will be seen that amongst writers on *Crassulaceae* there has usually been a tendency to put a number of small-flowered forms, with more or less separate petals and an androecium isomerous with the corolla, either into separate genera or into special groups in the genus *Crassula.* The former course has clearly been a failure. It was based on differences in the number of floral parts, the number of ovules in the carpels, the shape of the nectar-scales, but while these characters may be here and there usefully employed in placing nearly allied species into groups they are useless for generic distinction, as they may separate species which are otherwise closely allied and moreover they are sometimes not constant in one and the same species.

I, therefore, have placed them all into the genus *Crassula* under the sectional name of *Tillaeoideae*[1].

I include in them the following from Harvey and Sonder's Flora Capensis: the genera *Helophytum, Bulliarda, Crassula* sect. *Lycopodioides,* sect. *Glomeratae,* sect. *Filipedes* (excl. *Cr. centauroides* and *brachypetala*) and a number of species published after the second volume of the Flora Capensis.

The DISTRIBUTION of the section is very interesting and parallelled by other groups of plants well represented in South Africa. The majority of species occur in South Africa, but there are also a number in Australia, New Zealand and Tasmania; South America (especially Chile and Peru) has again a large number of species. From South Africa they extend through the mountainous parts of tropical Africa to Socotra, the Mediterranean region, the western part of the continent of Europe, and the Canary Islands. One species is found in the Himalayas. In America they extend through Mexico to the United States. I hope to be able to give a more detailed account of the distribution shortly, when I shall deal with the species found outside temperate South Africa.

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[1] Bentham and Hooker in Gen. Pl. II, 656 had placed most of them under *Tillaea,* L., but they state "Inter Crassulam et Tillaeam nullum est divisum bonum."

A sharp definition of the sect. *Tillaeoideae* is impossible. They consist of small, mostly annual plants adapted in the majority of cases to damp conditions (some are real water plants) while some are distinct Xerophytes[1]. The flowers are rarely placed in complicated inflorescences, the petals are stellate, rarely suberect, but never form a decidedly urceolate corolla (though an indication towards it is found, e.g. in *Cr. expansa*, ~~Ait.~~ /Dryand.). Moreover the subapical mucro so often (though not universally) found in the species belonging to *Eu-Crassula* is practically always absent. I have only found an indication of it in *Cr. expansa*, ~~Ait.~~ /Dryand. (*Cr. filicaulis*, Haw.). As a matter of fact no sharp line can be drawn between the *Tillaeoideae* and other sections of *Crassula*. *Cr. expansa*, ~~Ait.~~ leads up to *Cr. acutifolia*, Lam. and allied species. Various species lead up to *Cr. centauroides*, L. and allied species. These species again cannot be sharply separated from the sect. *Petiolares* and these again lead to the sect. *Latifoliae*. There are even relations with Harvey's section *Crenato-lobatae* and with the subgenus *Pyramidella*, as will be noted later on. It looks almost as if these small-flowered species had formed the original stock from which the other *Crassulas* more or less directly originated. I have grouped the species known to me around a number of species fairly well known. Perhaps later on it will be possible to give a key to all of them.

Before concluding these preliminary remarks I wish to say a few words on the nectar-scales. These delicate structures (sometimes not much more than 1/10 mm. long) are often very difficult to detect after the material has once been dried. However, whenever I have had sufficient material at my disposal I have always been able to find them in any plant belonging to this section, except in specimens of *Cr. muscosa* (L.) Roth. (*Bulliarda muscosa*, DC.) and in *Cr. bonariensis*, Cambess. (*Tillaea purpurata*, Hook. f.). Other observers have also failed to detect them in these plants, which really seem to lack them. In South African species they appear to be always present. The nectar-scales (squamae) are generally very characteristic in shape and size, but, owing to the difficulties of dissecting, one cannot always be quite sure of their exact shape and size when one has to deal with dried material only.

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[1] We find the same combination of waterplants and distinct Xerophytes also in the genus *Hypoxis* (in the older sense) and in other genera, or at all events in closely allied genera.

As the plants here dealt with are all distinctly protandrous, the carpels reach their final shape after the stamens have discharged their pollen, when the anthers have consequently lost their original shape. It will, therefore, be understood that in the text figures the stamens and carpels have been drawn from different flowers. As a rule I have represented in each of these figures a portion of the calyx, a petal, a stamen, and a carpel with its nectar-scale all drawn to the same scale in each figure and in addition a nectar-scale more greatly enlarged. For the excellent photographs which, though taken from dried material, will, I hope, sufficiently indicate the habit of the species, I am indebted to Mr J. Hewitt, M.A., Director of the Albany Museum.

I. *Helophytum* group. Waterplants. Stem simple or slightly branched. Lower internodes elongated. Flowers solitary axillary or in axillary cymules, pedicellate, 4-merous. Carpels 1-ovulate.

A. Stem slender, filiform. Flowers usually solitary. Calyx-lobes very short.
    1. *Cr. natans,* Thunb.
B. Stem swollen, hollow. Flowers in subsessile axillary cymules. Calyx-lobes much longer than in 1.
    2. *Cr. inanis,* Thunb.

II. *Vaillantii* group. Marsh- or landplants. Stem simple or forked. Flowers axillary or terminal, usually solitary, 4-merous. Carpels with several ovules (usually 6—10, rarely less).

A. Leaves and sepals papillose.
    3. *Cr. papillosa,* Schönl. et Bak. f.
B. Leaves and sepals glabrous.
    a. Leaves longer than flowers.
        α. Calyx-lobes ovate, obtuse.
            4. *Cr. Vaillantii* (Willd.), Schönl.
        β. Calyx-lobes lanceolate, acute.
            5. *Cr. decumbens,* Thunb. (non E. et Z.).
    b. Leaves shorter than flowers.
        6. *Cr. brevifolia* (E. et Z.), Schönl.

III. *Aphylla* group. Unique amongst *Crassulaceae* owing to frequent absence of leaves. Their place is taken by the swollen internodes. A small plant 1·5—2 cm. high. Stem sparingly branched. Flowers terminal, normally 4-merous. Carpels 2—4 ovulate.

7. *Cr. aphylla,* Schönl. et Bak. f.

IV. *Filicaulis* group. Richly branched annuals with elongated internodes and divaricate branches. Flowers solitary on filiform pedicels, chiefly in the axils of the upper leaves sometimes also terminal, normally 5-merous. Carpels pluri-ovulate.

A. Pedicels elongating after flowering.
8. *Cr. expansa*, ~~Ait.~~ Dryand.
B. Pedicels not elongating after flowering.
a. Calyx and corolla about equal in length.
1. Pedicels 1·2—2·4 cm. long.
9. *Cr. tenuis*, Wolley Dod.
2. Pedicels 3—5 mm. long.
10. *Cr. oblanceolata*, Schönl. et Bak. f.
b. Calyx much longer than the corolla.
11. *Cr. Lambertiana*, Schönl. et Bak. f.

V. *Glomerata* group. Landplants. Stem usually richly branched with usually multi-flowered axillary or terminal inflorescences. Flowers normally 5-merous. Carpels with 2 (rarely 1) ovules.

A. Flowers mostly in glomerate or sometimes cymoso-paniculate terminal inflorescences.
12. *Cr. glomerata*, Linn.
B. Flowers in few-flowered axillary and terminal short inflorescences.
a. Calyx-lobes longer than corolla.
1. Leaves linear, calyx-lobes linear, acute. Petals oblong, blunt. Ovaries 2-ovuled.
13. *Cr. Zeyheriana*, Schönl.
2. Leaves ovate. Calyx-lobes ovate-obtuse. Petals lanceolate. Ovaries 1-ovuled.
14. *Cr. parvipetala*, Schönl.
b. Calyx-lobes shorter than corolla. Stem prostrate, white, angular.
15. *Cr. albicaulis*, Harv.
C. Flowers in more or less lax inflorescences.
a. Stem and leaves hairy. Leaves lanceolate.
16. *Cr. hirsuta*, Schönl. et Bak. f.
b. Stem and leaves glabrous. Leaves oblong, ovate or spathulate.
1. Pedicels short.
17. *Cr. minutiflora*, Schönl. et Bak. f.
2. Pedicels slender.
18. *Cr. tenuipedicellata*, Schönl. et Bak. f.

VI. *Muscosa* group. Small annual or perennial plants with mosslike aspect, frequently with numerous shortened axillary branches, often with imbricate leaves, including species which favour damp situations, but often distinctly xerophytic. Flowers subsessile or shortly pedicelled, very small, axillary, either solitary or in small tufts. Petals almost free. Ovaries in nos. 23 and 24 multi-ovulate, in the others 2-ovulate.

A. Annuals.

a. Calyx longer than petals. Petals ovate subacute minutely cuspidate. Leaves ovate or sublanceolate, obtuse or acute. Internodes fairly regular throughout the length of the stem.

19. *Cr. filamentosa*, Schönl.

b. Calyx longer than petals. Petals lanceolate acuminate or hairpointed. Leaves much acuminate or hairpointed. Internodes usually very short, rarely as long or longer than the leaves and in that case the upper gradually shorter.

20. *Cr. campestris*, (E. & Z.) Endl.

c. Petals blunt, rounded at the apex. Leaves with rough margin.

1. Sepals slightly longer than petals.

23. *Cr. bergioides*, Harv.

2. Sepals nearly 3 times the length of the petals.

24. *Cr. aristata*, Schönl.

B. Perennials[1] with woody stem at the base (frequently tuberous in 22).

a. Leaves ovate lanceolate tapering to a blunt point. Branches slightly flexuous. Calyx shorter than petals.

21. *Cr. parvula*, Harv.

b. Leaves from an oval base lanceolate acute. Branches usually rigid. Calyx about the length of the petals.

22. *Cr. transvaaliensis*, (O. K.) K. Schum.

VII. *Lycopodioides* group. Small xerophytic halfshrubs with closely set 4-ranked leaves with elongating branches and in addition often with numerous very short axillary branchlets. Flowers 5-merous, subsessile, very small, either solitary or in few flowered dense cymules in the axils of the upper leaves. Carpels with more than 2 ovules.

25. *Cr. lycopodioides*, Lam. (sensu lat.)

VIII. *Umbellata* group. Marsh- or landplants either with spathulate or distinctly petiolate flattish leaves, in some species arranged in a radical rosette. Inflorescence sub-umbellate. Flowers with more or less long, very slender pedicels, 4-merous or 5-merous. Carpels with more than 2 ovules.

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[1] In the two perennial species here mentioned the plants flower at a very early stage, and thus they may appear to be annual. The specimens should therefore, in case of doubt, be compared with the detailed descriptions. Otherwise confusion may easily arise. I have, e.g., often seen young specimens of *Cr. parvula* growing in damp places in the shade which were almost indistinguishable from *Cr. filamentosa*, Schönl.

A. Flowers 4-merous.
a. Stem slender, branched.
26. *Cr. Dodii*, Schönl. et Bak. f.
b. Stem very short, sparingly branched.
a. Petals ovate, obtuse.
27. *Cr. umbellata*, Thunb.
b. Petals ovate-lanceolate, acuminate.
28. *Cr. Marlothii*, Schönl.
B. Flowers 5-merous.
a. Calyx-lobes blunt, half as long as the obovate-oblong petals.
30. *Cr. diaphana*, ~~E. Mey.~~ Harv.
b. Calyx-lobes subacute, equalling the ovate, acute petals.
29. *Cr. silvatica*, Licht.

IX. *Corallina* group. Small herbaceous perennials with many short, densely leafy branches rooting readily at the lower nodes. Flowers 5-merous, from the axils of the upper leaves, usually pedicelled.

Leaves connate, oblong, obtuse. Calyx-lobes and petals obtuse.
31. *Cr. peploides*, Harv.
Leaves subglobose or ellipsoidal. Calyx-lobes short, obtuse. Petals ovate.
32. *Cr. corallina*, Thunb.

NOT CLASSIFIED. 33. *Cr. Dregei* (Harv.), Schönl.
34. *Cr. debilis*, Thunb.
35. *Cr. cordata*, Thunb.

1. *Crassula natans*, Thunb. Prodr. (1794), 54, Fl. Cap. ed. Schultes, 281; DC. Prodr. III, 389. (Plate II, fig. 1.)

Tillaea capensis, L. Syst. Veg. XIV, 170; L. f. suppl. 129.
Helophytum natans, E. et Z. Enum. no. 1843, 289; Harvey in Harvey and Sonder, Fl. Cap. II, 328.
H. filiforme, E. et Z. Enum. no. 1844, 289.
H. fluitans, E. et Z. Enum. no. 1845, 289.
H. reflexum, E. et Z. Enum. no. 1846, 289.
Bulliarda filiformis, E. et Z. Enum. no. 1850, 290.
B. elatinoides, E. et Z. Enum. no. 1849, 290.
Tillaea inanis, Steud. Nom. ed. 2, II, 687 (ex Ind. Kew.).
T. elatinoides, Walp. Rep. II, 251.
T. filiformis, Endl. ex Walp. Rep. II, 252.
T. fluitans, Endl. l.c.
T. reflexa, Endl. l.c.

Annua aquatica glaberrima. Caulis filiformis e basi ramosus erectus vel fluitans internodiis inferioribus elongatis superioribus brevissimis. Folia carnosula, inferiora linearia vel spathulata obtusa vel subacuta, superiora spathulata, obovata vel subrotundata. Flores axillares solitarii vel binis versus summitatem aggregati pedicellis capillaribus foliis brevioribus. Calyx gamosepalus subundulato—4-dentatus, dentibus brevibus obtusis, quam petala duplo brevior. Petala obovata vel ovato-spathulata obtusa alba vel rosea vel rubro-lineata stellatim patentia. Filamenta subulata petalis breviora antheris late oblongis primum sanguineis dein fuscis. Ovaria uniovulata dorso apicem versus subumbonata stilis brevibus abrupte filiformibus reclinatis. Squamae obcuneatae elongatae apice rotundatae et leviter emarginatae.

Length of branches and leaves very variable according to the conditions under which the plants are growing. The following measurements were taken from live specimens collected by Mrs T. V. Paterson near Redhouse (Aug. 1910). Submerged leaves (lanceolate acute) 8 mm. long (with a vagina 1·5 mm. long), upper leaves (obovate-spathulate obtuse) circ. 7 mm. long (with very short vagina). Pedicels 4 mm. long. Calyx (incl. the very short lobes) ·75 mm. long. Petals (white) 2 mm. long. Stamens 1 mm. long (filaments subulate, thickest in the middle, green; anthers red, broadly oblong. Carpels ·75 mm. long, of which $\frac{1}{3}$ belongs to the style. Squamae nearly as long as the ovaries.

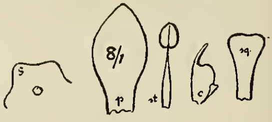

Fig. 1.

I have followed Harvey in lumping together under this species (which he calls *Helophytum natans*, E. et Z.) the various species of *Helophytum* described by Ecklon and Zeyher and also the species of *Bulliarda* mentioned above, but Zeyher, 650 (*Bulliarda filiformis*) and E. and Z. 1843 (named *Helophytum natans β minus* in the Herbarium of the South African Museum) may possibly be distinct. The latter was found at Greenpoint near Capetown. From the dried material at my disposal I have not been able to come to any decision. Otherwise the varieties distinguished by Harvey appear to me to be nothing but growth-forms.

The species is always described as annual, but in permanent pools it may become perennial as it constantly produces new shoots, the older ones dying off.

It is found in pools and rivers of the southern coast regions of South Africa, but penetrates far inland where suitable conditions are found and consequently has also a considerable vertical range. In East

Africa it is represented by a distinct robust variety which Engler mistook for a variety of *Cr. Vaillantii.*

Diels has identified with it some specimens found by him in Australia[1], and judging from his dried specimens which I have seen, I agree with him that its range extends to Australia. The floral structure is, as far as I can judge, exactly the same in the Australian and S. African specimens.

Forma *fluitans.* Stem long and floating, lower leaves linear elongate, very far apart, upper spathulate.

Retreat Vley, vi, 96, Wolley Dod, 1218; Flats beyond Rondebosch, viii, 95, Wolley Dod, 270; Sandhills, Capeflats, x, 96, Wolley Dod, 1781; Salt River flats, vii, 83, Wilms, 3212; C. b. sp., Lalande; Liesbeck River, x, 1815, Bergius; ibid. x, 1816, Bergius (sub *Tillaea aquatica*); C. b. sp., Mund et Maire; in water ditches near Capetown, 1824, Ludwig; in stagno pr. Zoutriver, xi, 1815, Bergius; Paarlberg, Wilms 3207; on moist spots near the banks of the Zwartkops River, Z. 653, 2510, E. and Z. 1844, 1845.

Forma *parvifolia.* Leaves except the uppermost 2—3 mm. long, lanceolate acute, recurved.

C. b. sp., Drege.

Forma *obovata.* Lower leaves spathulate, upper obovate.

C. b. sp., Drege, 6877b; Mooreesburg, xi, 84, Bachmann, 737; in the Zwartkops River, Z. 922; Murraysburg, viii, 78, Tyson, 70; Burghersdorp, x, 08, Pocock, 34; Zwartkei, Mrs Barber, 30; Pretoria, vii, 83, Wilms, 594; Belfast, Jenkins (Transvaal Mus. Herb.) 6780.

Forma *amphibia.* Leaves equalling or exceeding the internodes, the medial and lower linear squarrose, the upper spathulate.

Van Rhynsdorp, 100 m., ix, 00, Diels, 420; Camp Ground, Cape Peninsula, Wolley Dod, 269; Redhouse, Mrs T. V. Paterson; Middledrift, Mr F. S. Salisbury; at the base of the Boschberg, ix, 2500 ft, MacOwan, 250.

(?) Forma *filiformis.* All the leaves linear or linear oblong.

Wynberg flats, vii, 96, Wolley Dod, 1262; on bridge beyond Campsground, vii, 95, Wolley Dod, 271, 272; in stagnant water near Wynberg, viii, 92, Schlechter, 1528; Platteklip, x, 98, 3000 ft, MacOwan in Herb. Austr. Afr. 1857; in damp places on the plain on Table Mountain (Alt. v.), Aug., E. and Z. 1849; in damp places at Platteklip, Oct., E. and Z. 1850.

E. and Z. 1843 (in stagnant water near Greenpoint = *Hel. natans β minus*, E. et Z.) seems to belong to this form (= *Bulliarda filiformis*, E. et Z.) and seems to be identical with Z. 650, also with Z. 634 (in damp places near the Breederiver, Nov.) and Z. 116 (Groenepoint, Sep.).

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[1] "Avon above Newcastle in a small waterhole, 175 m., Diels, 3931."

E. and Z. 1846 (in damp places on the fields near the Zwartkops River = *Helophytum reflexum*, E. et Z.) appears to be identical with Z. 2513 (damp places in the dunes at the mouth of the Ourustriver near Gildenhuis, Aug.) and may also be distinct, but a decision can only be arrived at after examination of a large amount of live material.

2. *Crassula inanis*, Thunb. in Prodr. (1794), 54; Fl. Cap. ed. Schultes, 282. (Plate II, fig. 2.)

Tillaea perfoliata, Linn. Syst. Veg. XIV, 170; Linn. f. Suppl. 129.

Helophytum inane, E. et Z. Enum. no. 1847, 289 (1837), et var. *β latifolium*, E. et Z., ibid.

Annua aquatica glaberrima. Caulis debilis vel erectus teres, inferne simplex, apice parum ramosus ad nodos inferiores saepe radicans internodiis cavis elongatis albis. Folia quam internodia breviora rarius iis aequilonga vel longiora connata ovata vel ovato-lanceolata obtusa vel subacuta. Flores tetrameri ex axillis foliorum superiorum cymoso-corymbosi breviter pedicellati. Pedicelli capillares longitudine floris. Calyx gamosepalus 4-dentatus, laciniis ovatis obtusiusculis virescentibus. Petala alba lanceolato-ovata obtusa quam calyx duplo longiora suberecta. Stamina quam petala breviora, filamentis subulatis, antheris ovatis. Ovaria 1-ovulata ovata stilis brevibus reclinatis. Squamae obcuneatae elongatae apice truncatae.

Height usually 20—25 cm. Lower internodes often up to 5 cm. long, upper gradually smaller. Leaves usually about 1 cm. long, 2—3 mm. broad. Petals about 2 mm. long.

This species is almost restricted to the southern coast regions of South Africa. It appears to be rare in the S.W. coast region, but is fairly common from Uitenhage to Natal and extends to Lydenburg in the Transvaal. It is found from near sea-level to an altitude of 1800 m. In the western parts it flowers in November and December, while in the eastern parts it flowers already in July. Like so many water-plants it varies considerably in its vegetative organs. Thus in specimens from Komgha (Flanagan, 1105) the leaves are only 2—3 mm. long and are broadly ovate, but I have seen specimens from other parts with leaves up to 2·5 cm. long. Near Grahamstown they vary between 4 and 13 mm.

Klein Drakenstein, near the Bergriver and on the Zuurberg, Drege; Langekloof, George, E. and Z. 1847 (var. *β latifolium*, E. et Z.); Vanstaadens and Uitenhage, Z. 729, 2509; Grahamstown, Schönland, 409, Miss M. Daly and Miss M. Sole, 187; near Pirie, Kingwilliamstown, Sim, 1199, Rev. R. Godfrey, 99; Komgha, Flanagan, 1105; Charlestown, Wood, 4799; Gt Umteni, Schlechter, 5899; Standerton, Schlechter, 3467; Lydenburg, Wilms, 501.—Sine loco, Mund et Maire C. b. sp. Nov. 1819.

3. *Crassula papillosa,* Schönl. et Bak. f. in Journ. of Bot. XXXVI (1898), 371. (Plate II, fig. 3.)

Cr. limosa, Schönl. in Rec. Alb. Mus. 1 (1903), 58.

Caulis reptans filiformis ad nodos remotos radicans. Rami breves adscendentes foliosi. Folia connata ovato-spathulata subpetiolata carnosula interdum irregulariter crenulata utrinque minute papillosa. Flores solitarii ex axillis foliorum superiorum pedicellati, pedicellis filiformibus, tetrameri petalis quam sepala parum longioribus. Sepala oblongo-obovata obtusa basi connata extus minute papillosa. Petala ovata apice minutissime cucullata alba. Stamina quam petala breviora filamentis subulatis antheris ovatis. Carpidia staminibus subaequilongis ovariis oblique ovatis 6—8-ovulatis, stilis ovariis subaequilongis subulatis. Squamae albae obcuneatae apice dilatatae et rotundatae.

A creeping plant only found on high mountains in muddy places, rooting at the nodes and sending up short branches with somewhat crowded leaves. Creeping stem (which in its end portions bears the flowers) 7—12 cm. long, internodes 5—9 mm., ascending branches about 1 cm. long. Leaves 3—3·5 mm. long. Pedicels about 11 mm. long. Petals about 2 mm. long.

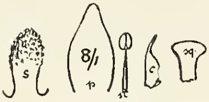

Fig. 2.

On the summit of the Matroosberg, 7434 ft, R. Marloth, 1999; rocky places on the Sneeuwbergen, about 4000 ft, Bolus, 2061; Majuba Nek, Herschel distr., Dec. 1915, Hepburn, 105; on mud on the top of the Andriesberg, 6700 ft, E. E. Galpin, 1922 (except the specimens collected in April, 1895, which belong to *Cr. Vaillantii* (Willd.), Schönl.)

The description was drawn up from fresh specimens sent by Mr Hepburn. In Galpin's specimens the lateral branches are more elongate, and also bear flowers, and this seems to be also the case in the other specimens quoted.

4. *Crassula Vaillantii* (Willd.), Schönl. (Plate II, fig. 4.)

Tillaea Vaillantii, Willd. sp. I (1797), 720.

T. rupestris, Hochst. Verz.

T. aquatica, Lam. Illustr. no. 1750 t. 90, fig. 1.

T. prostrata β, Poir. dict. 7, 674.

T. angustifolia, Nutt. Ms., Torrey and Gray, Fl. of N. Am. I, 558.

T. viridis, Wats.

Bulliarda Vaillantii, DC. in Bull. Soc. Phil. n. 49, I (1803), Pl. gr. t. 74, Prodr. 382; A. Rich. Fl. Abyss.; Don, Gen. Syst. III, 99; Ecklon et Zeyher, Enum. no. 1848, 289; Harvey in Harvey and Sonder, Fl. Cap. II, 329.

Tillaeastrum viride, Rose, in Bull. N. York garden, III, 2.

Sedum minimum, etc. Vaill., Paris, 181, t. 10, fig. 2 (ex DC.).

Annua erecta vel rarius decumbens glaberrima dichotome ramosa. Caulis ramique teretes laxe foliosi. Folia opposita sessilia basi connata linearia vel subulata obtusa vel subacuta intus planiuscula patentia quam internodia breviora. Flores e dichotomis solitarii pedicellati, pedicellis erectis tenuibus foliis subaequilongibus vel longioribus, tetrameri interdum pentameri vel trimeri. Calyx semiquadrifidus laciniis erectis ovatis obtusis carnosis persistentibus quam petala 1/3 vel dimidio brevioribus. Petala patentia ovata obtusiuscula carnea. Stamina petalis subaequilonga filamentis subulatis antheris flavis late ovatis. Ovaria subtrigona 2—12-ovulata. Stili brevissimi filiformes. Squamae lineares apice leviter dilatatae.

This species, which grows in water or on mud, is 3—10 cm. high. The length of the leaves varies between 1 and 4 mm. The petals are about 1·5 mm. long. The number of ovules in each carpel varies considerably. Sometimes there are only two, but mostly 10—12. I have only seen tetramerous flowers. However, De Candolle in Pl. Grasses, t. 74, states that pentamerous and even trimerous flowers occur. In spite of its wide distribution this species is usually easily recognised, though in South Africa it has been sometimes confused with *Crassula natans,* Thunb. (*Helophytum natans,* E. et Z.) from which, even in the dry state, it can easily be distinguished by its longer calyx-lobes.

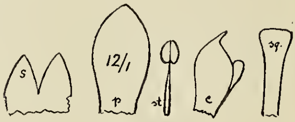

Fig. 3.

General distribution: South Africa, Kilimandjaro, Abyssinia, Mediterranean region (especially the western portion, but it also occurs in the Cyrenaica and according to Holmboe in Cyprus), Portugal, France, on one of the Austrian islands of the Danube, United States and Mexico.

In all the countries mentioned the species seems to be very local. Its somewhat erratic general distribution is to a certain extent parallelled by its distribution in South Africa where, although it is found from near sea-level up to an altitude of 8500 ft and in all regions where suitable conditions for its growth are met with, yet it seems to be here also always rather patchy in its distribution.

Pools by Maitland station, Wolley Dod, 3065; Darling, Schlechter, 5351; Redhouse, Mrs T. V. Paterson, 2324; Uitenhage, E. and Z. 1848; Oorlogskloof, Onder Bokkeveld, Schlechter, 10936; Somerset East, Schlechter, 2767; Mount Hope Farm, Upper Zwart Kei, E. E. Galpin, 2644; summit of Andriesberg, E. E. Galpin, 6613; at base of Doodmans Krans, Barkly East distr., 8500 ft, E. E. Galpin, 6613; Likhoele, Basutoland, Mrs Dieterlen, 1056a; Hoogeveld, Transvaal, Rehmann, 6688.

5. *Crassula decumbens*, Thunb. (non E. et Z.) Prodr. (1794), 54, Fl. Cap., ed. Schultes, 280; DC. Prodr. III, 389. (Plate II, fig. 5.)

Bulliarda trichotoma, E. et Z. Enum. no. 1851, 290; Harvey in Harvey and Sonder, Fl. Cap. II, 330.

Crassula Thunbergiana, Roem. et Schult. Syst. VI, 733.

Cr. Leipoldtii, Schönl. et Bak. f. in Journ. of Bot. XL (1902), 288 (Leipoldt, 392).

Tillaea decumbens, Willd. in Sp. pl. I, 721.

T. trichotoma, Walp. Rep. II, 251.

Caulis teres glaber erectus vel decumbens ramosus vel subsimplex, ad nodos inferiores radicans. Folia glabra tereti-subulata vel linearia vel lineari-lanceolata connata saepissime patentia. Flores tetrameri axillares et terminales fastigiati pedicellati, pedicellis filiformibus longitudine foliorum vel brevioribus vel interdum longioribus. Sepala basi breviter connata lanceolata acuta carinata. Petala sepalis subaequilonga vel breviora oblongo-ovata basi connata. Stamina quam petala breviora filamentis subulatis antheris late ovatis. Ovaria oblique oblonga multi-ovulata stilis brevibus reclinatis. Squamae obcuneato-flabelliformes apice rotundatae.

Height usually 3—4 cm. Leaves 5—8 mm. long. Internodes frequently much longer than the leaves. Sepals 2—3 mm. long. Petals 2—2·5 mm. long. Stamens about 1·75 mm. long. Carpels ± 2 mm. long.

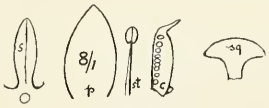

Fig. 4.

The relative length of sepals and petals varies considerably. It is, therefore, not advisable to keep up *Cr. Leipoldtii*, Schönl. et Bak. f., which is only distinguished from the type by longer sepals and laxer growth. The latter is not characteristic either.

Calvinia near Oorlogs Kloof, Diels, 621; Clanwilliam, Leipoldt, 392; Malmesbury distr., Bachmann, 920; Porterville, Schlechter, 4888; Wynberg, Schlechter, 1527 and Wilms, 3202; Observatory near Cape Town, Wolley Dod, 1430; Devil's Peak, Wilms, 3205; Appelskraal, Rivierzondereende, Z. 2511; Grootvaterbosch (Swellendam), Z. 2511 b; Riversdale, Rust, 269; Humewood near Port Elizabeth, Miss M. Daly,

1076, Mrs T. V. Paterson, 2298; Pr. b. sp., Mund et Maire (named *Tillaea verticillaris,* DC. in Herb. Berol.).

6. *Crassula brevifolia* (E. et Z.), Schönl. (Plate III, fig. 6.)

Nomen invalidum

Bulliarda brevifolia, E. et Z. Enum. (1837), no. 1852, p. 290; Harvey in Harvey and Sonder, Fl. Cap. II, 330.

Tillaea brevifolia, Walp. Rep. II, 251.

Annua pusilla e basi ramosa ramis patentibus internodiis quam folia multo majoribus. Folia brevissima carnosa lineari-obovata vel subrotundata obtusa. Flores axillares et terminales subfastigiati pedicellis filiformibus quam folia longioribus. Calyx profunde quadrifidus 2/3 longitudinis petalorum aequans laciniis oblongis obtusis. Petala oblonga obtusa alba. Filamenta subulata, antherae late oblongae. Ovaria 8—10-ovulata. Stili breves filiformes. Squamae stipitatae apice abrupte semilunulariae.

The plant, which grows in damp places, is usually only 2—3 cm. high, but may reach a height of 8 cm. It is easily recognised by its small leaves and its relatively large flowers. The leaves are 1—2 mm. long, the petals 3 mm. long.

Contrary to Int. Rules.

I have retained the specific name, as it is very suitable, and have given *Cr. brevifolia,* Harv. (Fl. Cap. II, 339) the name of *Cr. Pearsoni* (Ann. S. A. Mus. IX, 47). It flowers in September and October.

Near the Zoutrivier, Sept. 1815, Bergius (who states on the label "Caulis et ramuli di- et trichotomi diaphani striati pallide rosei. Folia carnosa ovata connata. Petala calyce duplo longiora, extus versus apicem macula rubra"); Cape Town, Z. 635; on the slopes of the Devil's Peak, E. and Z. 1851 (who describe the flowers as "pallide flavescentes"); Capeflats, Wolley Dod, 441, MacOwan, 3160 and Herb. Austr. Afr. 1753; near Claremont, Schlechter, 1530; Wynberg, Wilms, 3202; Three Anchor Bay, Wolley Dod, 1535; sandy places on the Zwartriver, Z. 5071; near Hopefield, H. Bolus, 12677; in sandy places near Alexandershoek, Schlechter, 5140.

7. *Crassula aphylla,* Schönl. et Bak. fil. in Journ. of Bot. XXXVI (1898), 371. (Plate III, fig. 7.)

Annua glabra pusilla. Caulis opuntiaeformis aphyllus supra parum ramosus erectus internodiis basi subteretibus apicem versus gradatim inflatis applanatis summo excavatis vel sparse foliosus foliis late oblongis obtusis, internodiis plus minusve filiformibus. Flores 4-meri (vel rarius 3-meri ?) terminales breviter pedicellati. Calyx obconicus lobis minutis subtrigonis. Petala late ovata. Stamina petalis subaequilonga filamentis linearibus apice constrictis antheris

late ovatis. Ovaria late et oblique ovata 2—4-ovulata. Stili breves filiformes patentes. Squamae...

Height 1·5—2 cm. Petals about 2 mm. long.

Boontjes rivier (Western Region), c. 700 m., Schlechter, 8664.

The specimens from which the original description was drawn up had no leaves at all, but I have since found in the Berlin Herbarium typical leaves on plants with filiform stems and gradations between this and the opuntia-like leafless forms.

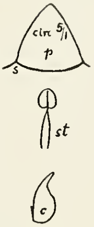

Fig. 5.

8. *Crassula expansa* (Dryander in) Ait. Hort. Kew. I, 390; Willd. Sp. pl. I, 1561; DC. Prodr. III, 389: Harvey in Harvey and Sonder, Fl. Cap. II, 354; Britten and Bak. f. in Journ. of Bot. XXXV (1897), 483. (Plate III, fig. 8.)

Cr. filicaulis, E. et Z. (non Haw.?) in Enum. no. 1883, 295.

Cr. maritima, Schönl. in Bull. de l'herb. Boiss. V, 1897, 862.

Cr. parviflora, E. Mey. in Herb. Drege.

Annua herbacea glaberrima e basi ramosa diffusa, ramis ramulisque filiformibus internodiis subteretibus inferioribus foliis longioribus superioribus gradatim brevioribus. Folia opposita subconnata patentia interdum leviter incurvata vel recurvata carnosula saepius anguste semicylindrico-oblonga intus plana vel canaliculata, rarius utrinque applanata acuta vel acuminata rarius subobtusa. Flores pentameri axillares solitarii vel superiores laxe cymoso-corymbosi pedicellis filiformibus in statu florifero brevibus deinde elongatis. Calycis lobi lanceolati subobtusi extus convexi intus subplani quam petala breviores vel iis subaequilongi. Petala erecto-patentia alba vel medio viridi-lineata basi connata subovata interdum dorso infra apicem minutissime mucronulata. Stamina quam petala breviora filamentis albis subulatis antheris luteis. Carpidia staminibus subaequilonga ovariis oblique oblongis stilis subulatis. Squamae minutae obcuneatae apice rotundatae, interdum apice leviter emarginatae.

Height of plant usually 12—15 cm. Lower internodes 1—2 cm. long. Leaves ± 1 cm. long. Pedicels in flowering stage 3—5 mm. long, lengthening to about 2·4—3·4 cm. when the fruit ripens. Sepals about 2·5 mm. long. Petals 3—4 mm. long. The relative length of sepals and petals varies considerably. In cultivated specimens I have often observed tetramerous flowers. Along the coast the vegetative organs often assume a red colour. The plant may sometimes last

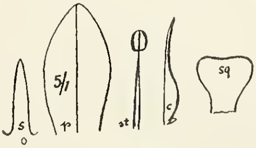

Fig. 6.

more than one season. In that case the base of the stem becomes hard and woody.

This species is chiefly found in the coast districts of South Africa. It appears to be absent from the Cape Peninsula. It extends to Namaqualand, Beaufort West, Graaff Rēinet and Queenstown. Its altitude ranges from near sea-level to at least 4500 ft.

Plants from the eastern parts of Cape Colony (but also sometimes in the western, e.g. Diels' specimens from Clanwilliam) have generally somewhat smaller flowers than the type. They agree with the types of *Cr. filicaulis*, E. et Z. which came from Uitenhage and the Gauritz River. This form is common near Grahamstown and Port Alfred. Its leaves are either exactly as in the type or they are flattened, oblanceolate, obtuse. Sometimes the two forms of leaves are found on the same plant. The petals are only 2 mm. long, the ovaries are slightly broader and the styles relatively shorter than in the type, but no sharp line can be drawn between the small-flowered form and the type. The latter was described by me as *Cr. maritima.* A luxuriant form of the former was erroneously identified by Mr E. Baker and myself in Journ. of Bot. XXXVII (1898), 372 as *Cr. peploides,* Harv. Whether Ecklon and Zeyher's *Cr. filicaulis* is the same as the species described by Haworth in Phil. Mag. 1824, 186, seemed to me very doubtful. It was described as having "ramis radicantibus." This I have never seen in otherwise typical wild specimens of *Cr. expansa,* Ait., but specimens in Herb. Berol. grown in the Berlin Botanic Garden in 1835 and 1842 show this character. At all events, they are rooted at the nodes of the lower, efoliated, creeping part of the stem, and thus possibly Haworth's species is also to be sunk in *Cr. expansa,* Ait.

A specimen collected at Uitenhage by Ecklon and Zeyher (Nov. 1825) was identified in the Berlin Herbarium as *Cr. pulchella,* Ait. Hort. Kew. ed. 1, I, 392. This plant is not mentioned in the 2nd ed. and is obviously not identical with *Cr. expansa,* Ait. If, as is possible, Aiton's plant is the same which Haworth has described as *Cr. pulchella,* Ait. in Rev. Pl. Succ. 1831, 12, it cannot be a South African plant at all, as it has alternate leaves, and such species are absent in South Africa[1].

Bentham, in Fl. Austral. II, 451, and Bentham and Hooker in Gen. Pl. II, 657, state that *Dasystemon calycinum,* DC. in Mém. sur la famille des *Crassulacées,* Paris, 1828, 15, t. 3, is *Cr. expansa,* Ait. However, neither De Candolle's description nor his figure can be applied to *Cr expansa*, Ait., and as further his description does not tally altogether with the figure, the name is better altogether ignored, whether the plant came from South Africa, or, as the author states, from Australia. It may be a monstrous form of *Cr. glomerata*, Linn.

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[1] Willdenow in Sp. pl. I, 1586, says that *Crassula pulchella,* Ait. is allied to *C. glomerata.* He gives the distinguishing characters, which, however, are hardly sufficient to help us in identifying the plant.

Little Namaqualand, Richtersveld, Doornpoort ravine, Pearson, 6126 (in these specimens the sepals are slightly gibbous near the apex on the back and the ovaries are minutely ciliate on the inner margin); Nieuwe Rust, Pearson, 5504; Lislap, Z. 653; Steinkopf, Schlechter, 11503; Clanwilliam, Diels, 309 ("petala viridula, rubro-marginata"); Matroosberg, Dec. 1905, Miss S. Treleaven; Piquenierskloof, Schlechter, 4920; Beaufort West, O. Kuntze (in Herb. Berol.); Graaff Reinet, Bolus, 18; Hopefield, Malmesbury distr., Gürke, 975; Hawstown, Schlechter, 9469; between Breede River and Hassegay Kloof, Z. 2524; Riversdale, Schlechter, 1979, Rust, 244; Humansdorp, Mrs G. R. Christie and Schlechter; Redhouse, Mrs T. V. Paterson, 324 (these specimens have obovate leaves only about 2·5 mm. long and contracted at the base); Redhouse, Mrs T. V. Paterson, 425; Uitenhage, Z. 985 and E. and Z. 1883; Grahamstown, Schönland, 412, MacOwan, 820; Port Alfred, Schönland, 1557; along the Kei River near Komgha, Flanagan, 1081; Windvogelberg, near Cathcart, T. R. Sim; Queenstown, Galpin, 2556; near Durban, Natal Gov. Herb. 2810; Lorenço Marques, Schlechter, 11534. These last specimens of Schlechter may represent a distinct species. The stem is creeping or decumbent and rooting at the nodes. The leaves have the general outline of the type, but are longer and broader, and appear to have been thinner. The material at my disposal is not suitable for a full description. They should be compared with Gueinzius' specimens from Natal referred to by Harvey (l.c. 364) which I have not seen. A similar form is found near the Victoria Falls (Rogers 5058).

9. *Crassula tenuis*, Wolley Dod, in Journ. of Bot. XXXIX (1901), 399. (Plate III, fig. 9.)

Annua ramosissima gracilis diffusa. Folia subsessilia vel sessilia elliptica vel oblanceolata obtusissima. Flores pentameri in axillis foliorum superiorum pedicellis gracillimis. Sepala ima basi connata lobis obovatis obtusis inferne attenuatis. Petala pallide rosea basi leviter connata quam sepala paullum longiora ovata subobtusa. Stamina carpellaque quam petala 1/4 breviora. Ovaria pauciovulata late et oblique ovata stilis brevibus filiformibus. Squamae stipitatae apice valde et abrupte dilatatae subtruncatae.

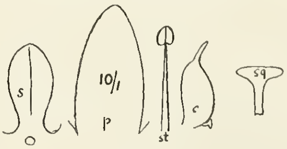

Fig. 7.

Height of plant 6—8 cm. Lower internodes about 1·5 cm. long, upper gradually smaller. Leaves up to 1 cm. long. Pedicels 1·2—2·4 cm. long. Petals about 2 mm. long.

Distinguished from its allies by its diffuse slender habit and the long slender pedicels.

Rocky shore near Camps Bay, Wolley Dod, 3369; on rocks at 1500 ft. on Lion's Head, Wolley Dod, 3676; Signal Hill, Cape Town, Wilms, 3252; near Hopefield, Malmesbury distr., Ulbrich, 2184; on hills near l'Aus, 2400 ft, Schlechter, 11213.

In Schlechter's specimens the leaves, pedicels and flowers are somewhat smaller than in the type, but the details of floral structure are otherwise the same.

10. *Crassula oblanceolata*, Schönl. et Bak. fil. in Journ. of Bot. XXXVI (1898), 365. (Plate III, fig. 10).

Annua radice filiformi. Caules multi ex eadem radice orti adscendentes ramosi. Folia oblanceolata vel oblongo-obovata sessilia plerumque patentia obtusiuscula basi cuneata quam internodia breviora. Flores pentameri axillares et terminales, pedicellis brevibus filiformibus. Sepala oblonga obtusa corollam subaequantia. Petala oblongo-ovata subacuta alba. Stamina quam petala breviora filamentis subulatis apice constrictis antheris late ovatis. Ovaria oblique obovata. Stili breviter subulati. Squamae e basi cuneatae abrupte et latissime sed breviter transversim dilatatae.

Branches 3—4 cm. long. Leaves 5—7 mm. long. Petals about 1·5 mm. long.

Kareebergen, alt. 1800 ft, Schlechter, 8306.

A plant found by Wilms (3198) "on the roof of our backroom at Capetown" appears to be the same species.

11. *Crassula Lambertiana*, Schönl. et Bak. fil. in Journ. of Bot. XXXVI (1871), 371.

Annua diffusa glabra. Caulis dichotome ramosus subpellucidus filiformis sparse foliosus internodiis quam folia longioribus vel superioribus brevioribus. Folia plana (?) obovata lanceolata basi attenuata subpetiolata. Flores tetrameri vel rare pentameri in ramulis terminales pedicellis tenuissimis. Sepala oblongo-obovata basi breviter connata. Petala roseo-albida ovata obtusa quam sepala breviora. Stamina petalis subaequilonga filamentis linearibus apice constrictis antheris late ovatis. Carpidia petalis subaequilonga ovariis 5—6 ovulatis stilis brevibus. Squamae quam carpella triplo breviores e basi lineari sursum dilatatae rotundatae.

Height of plant 3—6 cm. Lower internodes up to 2 cm. long. Leaves 1—2 cm. long. Pedicels of lower flowers 1·3 cm. long, of the upper 3—5 mm. long. Calyx-lobes 2—2·5 mm. long. Petals 1—1·2 mm. long.

Lamberts Bai, 10 ft, Schlechter, 8539; Piquenierskloof, 850 ft, Schlechter, 4920; Botterkloof, 2300 ft, Schlechter, 10886; Houtbay, 50 ft, Schlechter, 1011; Oorlogskloof, Calvinia, Diels, 1175.

12. *Crassula glomerata*, Linn. Mant. (1767), 60, Syst. Veg. ed. 14, 305; Bergius Descr. Pl. Cap. 85; (Solander in) Ait. Hort. Kew. ed. 1, I, 392: Thunberg, Prodr. 54, Fl. Cap. ed. Schultes, 281; Burm. f. Prodr. 8; Houttuyn, Linn. Pfl. Syst. VI, 280; Willd. Sp. pl. I, 1556; Haworth, Syn. Pl. Succ. 58, Rev. Pl. Succ. 12; DC. Pl. Gr. t. 57, Prodr. III, 389; Harvey in Harvey and Sonder, Fl. Cap. II, 352. (Plate IV, fig. 11.)

Thisantha glomerata, E. et Z. in Enum. no. 1929, 302.

Thisantha patens, E. et Z. l.c. no. 1930.

? *Cr. strigosa*, Lam. (*Thisantha strigosa*, E. et Z. l.c. no. 1932).

Cr. scabra, Willd. Sp. pl. I, 1556 (teste Haworth).

Cr. scleranthoides, Burm. f. Prodr. 3.

Cr. glabra, Haw. Syn. Pl. Succ. 58, Rev. 12; DC. Prodr. III, 389; Harvey in Harvey and Sonder, Fl. Cap. II, 353.

Cr. capillacea, E. Mey. a (ex Harvey, l.c.).

Annua. Radices fibrosae. Caulis herbaceus, erectus fastigiatim ramosus glabratus aut interdum scabridus. Folia cruciatim opposita sessilia connata lineato-lanceolata patula glabrata vel scabrida. Flores alii e dichotomis ramorum solitarii, subsessiles, alteri copiosissime aggregati ramos terminantes. Calyx semiquinquefidus segmentis ovato-lanceolatis crassis glabris vel papillosis, obtusis vel apice scabridis. Petala alba vel subrosea basi connata oblonga vel ovata subacuta glabra vel papillosa. Stamina basi petalis adnata filamentis subulatis albis rectis antheris ovatis luteis. Ovaria trigona extus convexa rugulosa 1—2 ovulata. Stili breves filiformes. Squamae minutae filiformes apice ampliatae.

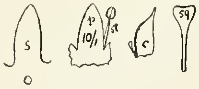

Fig. 8.

Height of plant 6—9 cm. Calyx ·7—1·1 mm. long. Tube of corolla ·25 mm., lobes about ·75 mm. long. Free parts of stamens ·75 mm. long. Carpels about ·75 mm. long.

I have been unable to find any essential difference between *Cr. glomerata*, L. and *Cr. glabra*, Haw. The latter is laxer in growth, but this can be produced easily in cultivating typical *Cr. glomerata*. The relative length of sepals and petals is a character which has no value. The former are at first shorter, but when the flowers get older, the relations become reversed.

Common in sandy places in S.W. Cape Colony (especially on the Cape Peninsula), but recently also found at Humewood, close to Port

Elizabeth (Miss M. Daly, 1078). Other specimens which I have seen are Zeyher, 636, 637, 5074, 5075, Ecklon, 28, E. and Z. 1929, 1930, 1931, 1932, Drege, 6881, 6882, Burchell, 358, Gürke, 251, 252 (Saldanha Bay), Wilms, 3200 (Robben Island) and 3206, Knoop, 88, Schlechter, 5138 and 7309, MacOwan, 3065, also one collected by Bergius "pr. urb. Oct. 15."

13. *Crassula Zeyheriana*, Schönl. nom. nov. (Plate IV, fig. 12.)

Cr. decumbens, Harv. (non Thunb.) in Harvey and Sonder, Fl. Cap. II, 353.

Thisantha decumbens, E. et Z. Enum. no. 1933, 302.

? *Cr. glomerata*, Berg. Pl. Cap. 85 (according to Plukenet's specimens in the British Museum, but does not agree with the description).

Diffusa vel procumbens e basi ramosa, ramulis filiformibus simplicibus vel ramulosis, glabris, internodiis foliis longioribus. Folia connata carnosula-linearia obtusa glabra. Flores minuti pentameri in axillis foliorum aggregati, apicem versus fastigiati pedicellati, pedicellis brevibus filiformibus. Sepala basi connata oblongo-linearia acuta glabra carnosula quam petala longiora. Petala basi connata oblonga obtusa. Stamina quam petala breviora filamentis subulatis antheris late ovatis. Ovaria oblique ovata 2-ovulata stilis brevibus subulatis. Squamae obcuneatae apice ampliatae rotundatae et leviter emarginatae.

Length of main branches usually about 6—8 cm. Lower internodes about 1 cm. long. Leaves about 2—4 mm. long. Sepals about 1·5 mm. long. Petals about 1 mm. long. Stamens and carpels about ·6 mm. long.

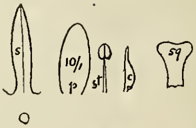

Fig. 9.

Saldanha Bay, Z. 651; Malmesbury distr., Ulbrich, 918, 919; Bergriver, Z. 651; Zoutriver, Z. 5072; Porterville, Schlechter, 4880, 10739; common on damp shady spots on the Cape Peninsula (Camps Bay, Greenpoint, Rondebosch, Wynberg, etc.), Wolley Dod, 459, 460, Z. 5077, Schlechter, 1529, Wilms, 3203, Diels, 7, Lalande (anno 1821).

14. *Crassula parvipetala*, Schönl. in Rev. Alb. Mus. II (1913), 450.

Nana radice filiformi caule parum ramoso laxe folioso. Folia carnosa late ovata in petiolum brevem contracta superiora quam inferiora gradatim breviora ovato-lanceolata, omnia minutissime papillosa. Flores pentameri in cymis paucifloris axillaribus et terminalibus pedicellatis, pedicellis brevibus filiformibus. Lobi calycis erecti ovati

obtusi minutissime papillosi. Petala lanceolata quam sepala breviora. Stamina quam petala breviora filamentis subulatis antheris latioribus quam longis connectivo distincto. Carpidia quam stamina breviora uni-ovulata ovariis oblique oblongis dorso papillosis, stilis subulatis ovariis subaequilongis. Squamae stipitatae apice oblique flabelliformes.

The plant is 1·5—2 cm. high. The stem bears 3—4 pairs of foliage leaves, the lamina of the lower of which is 7 mm. long, 6 mm. broad. The sepals are 1 mm. long (including the tube). The petals are about 3/4 mm. long, the stamens 1/2 mm. long, the carpels a trifle shorter. The squamae are about 2/3 the length of the ovaries.

Khamisberg. Shady damp places beneath rock. Pearson, 6658 (pr. pte).

This species is allied to *Cr. minutiflora*, Schönl. et Bak. f. and *Cr. tenuipedicellata*, Schönl. et Bak. f. Through its uniovulate ovaries it approaches also the species of *Crassula* which used to be placed in the genus *Helophytum*, E. et Z., but it also approaches Harvey's sect. *Crenato-lobatae* of the genus *Crassula*. Its leaves, though very small, remind us of those of *Cr. nemorosa*, E. et Z., but a more important character is the very distinct, one might almost say broadened connective which is usually found in that group.

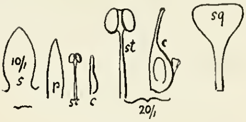

Fig. 10.

15. *Crassula albicaulis*, Harv. in Harvey and Sonder, Fl. Cap. II, 353.

"Perennis? Radix crassa sublignosa. Caules multi decumbentes di- trichotome ramosi, ramis divaricatis angulatis compressis valde pallidi (vel albi). Folia opposita patentissima linearia, lineari-oblonga, ovato-oblonga vel sublanceolata obtusa. Flores minuti pedicellis angulatis in dichotomis solitarii, superiores cymoso-aggregati vel subumbellati. Calycis lobi 2/3 longitudine corollae lineares obtusi carinati. Petala basi subconnata ovata obtusa. Stili breves subulati. Squamae cuneatae."

"Stems many, spreading 15—20 cm. from the crown, many times decompound, drying of an ivory whiteness and rather rigid. Lower internodes 2·4 (or more) cm. long, upper about 1·2 cm. long. Leaves 1—1·5 cm. long, 2—4 mm. broad. Pedicels 6—8 mm. long, swollen upwards. Flowers 2 mm. long, white. Petals about 1/3 longer than the stamens."

"Ezels Fonteyn, Namaqualand, Rev. H. Whitehead" (ex Harvey). This species is not known to me.

16. *Crassula hirsuta*, Schönl. et Bak. f. in Journ. of Bot. XXXVI (1898), 365. (Plate IV, fig. 13.)

Annua. Caulis flexuosus erectus vel adscendens teretiusculus pubescens ramosus. Rami nunc erecto-patentes, nunc adscendentes teretes subbrunnei vel rubescentes. Folia lanceolata vel lineari-lanceolata hirsuta acuta sessilia. Flores minuti pentameri cymoso-paniculati, interdum ex dichotomis solitarii, omnes breviter pedicellati. Calycis lobi oblongi obtusi hirsuti. Petala quam sepala 1/4 breviora subovata basi connata. Stamina quam petala paullum breviora filamentis subulatis antheris late oblongis, connectivis distinctis. Ovaria papillosa oblique ovata, 1-ovulata, stilis brevibus subulatis squamis clavatiformibus.

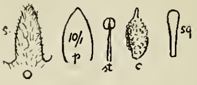

Fig. 11.

Height of plant 4—7 cm. Leaves 4—8 mm. long. Calyx about 1 mm. long. Petals ·75 mm. long.

Messklip on hills, 2000 ft, Schlechter, 11283 (pr. pte).

17. *Crassula minutiflora*, Schönl. et Bak. f. in Journ. of Bot. XL (1902), 288. (Plate IV, fig. 14.)

Annua decumbens tenuis gracilis. Caulis filiformis trichotome ramosus. Folia obovata plana sessilia. Flores pentameri breviter pedicellati numerosi, ad apices ramulorum aggregati, minutissimi. Calycis lobi ovati vel oblongo-ovati apice subobtusi. Petala calyce subaequilonga, in sicco pallide lutea. Stamina quam petala paullum breviora filamentis gracillimis antheris in sicco flavis rotundatis. Carpidia staminibus subaequilongis, ovariis oblongis vel ovato-oblongis, 1—2-ovulatis stilis brevibus. Squamae flabelliformes stipitatae.

Height of plant about 5·5 cm. Leaves 2—2·5 mm. long, about 2 mm. broad. Pedicels 1—1·5 mm. long. Calyx and corolla about ·7 mm. long. Stamens and carpels about ·5 mm. long.

Steinkopf, Namaqualand on hills, Schlechter, 11496.

18. *Crassula tenuipedicellata*, Schönl. et Bak. fil. in Journ. of Bot. XL (1902), 288. (Plate IV, fig. 15.)

Annua. Caulis gracilis filiformis dichotome ramosus. Folia laxe disposita plana oblonga vel oblongo-ovata, lata, sessilia vel subsessilia, apice obtusa vel subacuta, patentia. Flores pentameri in cymam laxam et paniculatam dispositi, pedunculo pedicellisque gracilibus, bracteis foliis similibus sed multo minoribus. Calycis lobi obovato-spathulati basi connati, apice minute papillosi. Petala ovata subacuminata quam sepala 1/3 breviora. Filamenta subulata, antherae late ovatae. Ovaria 1—2-ovulata dorso papillosa late et oblique ovata stilis tenuibus brevibus. Squamae magnae spathulatae.

Height of plant 3—6 cm. Leaves 8—11 mm. long, 3—5 mm. broad. Calyx-lobes 1·5 mm. long. Petals 1 mm. long. Stamens and carpels about 1 mm. Squamae about 1/2 mm. long.

On the hills near Arakup (Western region), 2300 ft, Schlechter, 11247.

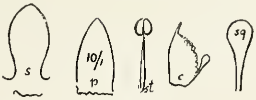

Fig. 12.

19. *Crassula filamentosa*, Schönl. nom. nov. (Plate v, fig. 16.)

Cr. muscosa, Harv. (non Linn.) pr. pte in Harvey and Sonder, Fl. Cap. II, 351.

Herbacea tenera e basi valde ramosa. Rami totum foliosi elongati flexuosi sub-simplices inferne cum ramulis abbreviatis caulibus albis subteretibus internodiis foliis subaequilongis vel subduplo longioribus. Folia carnosula incurva vel patentia ovata obtusa vel sublanceolata subacuta applanata, minutissime papillosa. Flores pentameri ex axillis foliorum superiorum fasciculati, fasciculis 2-multifloris, subsessiles vel pedicellati. Sepala oblongo-lanceolata extus minutissime papillosa quam petala parum longiora. Petala alba oblonga acuta minutissime cuspidata patentia. Stamina quam petala breviora filamentis albis subulatis antheris luteis ovatis. Ovaria oblique subovata 2-ovulata, stilis brevissimis subulatis. Squamae minutae apice latae rotundatae leviter emarginatae, basi breviter stipitatae.

Length of branches 3—6 cm. Leaves about 3 mm. long. Pedicels of some flowers very minute, others 2—3 mm. long. Sepals about 1 mm. long. Petals very slightly shorter.

The description and measurements are taken from live specimens collected at Majubanek, Herschel distr., by Mr J. Hepburn (Jan. 1916, no. 150).

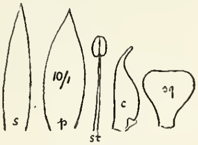

Fig. 13.

The following have somewhat narrower and more pointed leaves, and may have more acuminate sepals:

Kingwilliamstown, T. R. Sim, ~~1~~1773; Broughton near Molteno, Flanagan, 1695; Cala distr., Miss A. Pegler, 1532; Bloemfontein, Potts, 485; Summit of Buffelsriver Waterfall, Basutoland, Galpin, 6618; Leribe, Basutoland, Phillips, 6403; Doornkop, Burke, 381; Z. 346; Fairglen near Pretoria, Transvaal Mus. Herb. 1121; Hontbosch, Rehmann, 5966.

Some specimens under Phillips, 6403, have thicker stems, branched above the base, and shorter internodes than the type.

This species is not identical with *Crassula muscosa*, L., *Cr. muscosa*, Thunb., nor with *Tillaea muscosa*, L. It has, therefore, to receive a new name. I think it is sufficiently distinct from the following species, though in dried specimens it is sometimes almost impossible to separate them. It is closely allied to *Cr. pharnaceoides,* C. A. Mey., the type of which occurs in Abyssinia.

20. *Crassula campestris* (E. et Z.), Harv. in Harvey and Sonder, Fl. Cap. II, 351. (Plate V, fig. 17.)
? *Cr. campestris,* Endl. in Walp. Rep. II, 253.
Tetraphyle campestris, E. et Z. Enum. no. 1873, 294.
T. lanceolata, E. et Z. Enum. no. 1874, 294.
T. muscosa, E. et Z. Enum. no. 1872, 294[1].

Annua herbacea flaccida. Caulis filiformis e basi ramosus ramis totum foliosis decumbentibus vel adscendentibus inferne saepius cum ramulis abbreviatis. Folia connata imbricata vel remota ovato-lanceolata vel lanceolata acuminata vel capillari-cuspidata. Flores pentameri in fasciculis densis axillaribus subsessiles. Calyx quam corolla longior lobis subulato-lanceolatis acutissimis. Petala basi breviter connata alba lanceolata acuminata vel capillari-cuspidata. Stamina quam petala breviora filamentis subulatis antheris subrotundis. Carpidia staminibus subaequilonga ovariis oblique subovatis 2-ovulatis stilis brevibus subulatis. Squamae spathulatae.

The plant is frequently 2—4 cm. long, rarely more than 7·5 cm. The following measurements of the floral parts were taken from a specimen collected at Port Alfred: Sepals about 2 mm. long. Petals about 1 mm. long. Stamens ·75 mm. long.

This is a somewhat variable plant which at first sight very frequently looks exactly like *Tillaea muscosa,* Linn. In fact, I have had specimens lying side by side from France, from near sea-level in South Africa, the Andes of Peru (alt. 12,000—13,000 ft) and numerous other places, and these plants could not possibly be distinguished without dissection of the flowers, and as these are extremely delicate and Herbarium material not always quite suitable or scanty, we are faced with a great difficulty in deciding whether *Tillaea muscosa,* L. is so widely spread as is often assumed. This species has been called *Crassula muscosa* by Roth in Enum. Pl. Phan. Germ. I (1827), 994. I hope shortly to deal with all the species of *Tillaeoideae* not found in South Africa and further light may then be thrown on the question, but here I would only refer to a couple of points which make it desirable to suspend judgment and influence us, at all events for the present, in retaining the name which Harvey has adopted.

Tillaea muscosa, L. in Sp. Pl. (1753), 129, has been frequently described and figured, e.g. by De Candolle in Pl. Grasses, t. 73. In

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[1] A critical discussion of the possible further synonymy is being prepared, and will be published separately.

Western Europe it has usually 3-merous flowers, while our plant has 5-merous flowers. This difference, however, is not of much consequence as in Europe 4-merous flowers occur wild (I have seen them in specimens collected near Paris) and according to De Candolle 5-merous flowers are found in cultivated specimens. But there is a more serious objection to uniting the two species. In the accounts of the European plant at my disposal there is no mention of any "squamae," and I have not been able to find any in some specimens I dissected. De Candolle says "squamae nullae sed forsan minimae et oculos effugientes." Now, I feel very reluctant to unite under one species specimens with and without such characteristic organs. But even if they are to be united, the question arises, when once they are placed under *Crassula*, whether the name *Cr. muscosa* (L.), Roth is applicable. Linnaeus himself has described a *Cr. muscosa* in Amoen. acad. 6 and Pl. Afr. Rar. 10. I have no access at present to the original description. Willdenow in Sp. Pl. I, 1557, gives a short notice of it. According to him the plant is an annual and comes from "Ethiopia." He may have meant our plant (or a nearly allied one), but he also mentions the short description of Thunberg (Prodr. 54), and if we carefully examine the minute description which is found in Thunberg's Flora Capensis (ed. Schultes) we find that this refers to quite a different plant, namely *Cr. lycopodioides*, Lam. Harvey evidently was of opinion that Thunberg mixed up the latter and the plant he himself took to be *Crassula muscosa*, L. However, what I have said is sufficient to justify my action in not hurriedly adopting Linnaeus' name.

Forma *compacta*[1]—internodiis brevibus foliis dense imbricatis.

On hills near Arakup, 2400 ft, Schlechter, 11250; Packhuisberg, 2700 ft, Schlechter, 8651; Table Mt, Bergius, Sep. 1815; Riversdale, Bolus, 11278; Humewood, Miss F. Daly, 1079; along the Zwartkops-river, E. and Z., 1873; Port Alfred, Schönland, 1556; ? Lydenburg distr., Wilms, 577; Kingwilliamstown, T. R. Sim, 1766; Noodsberg, Natal, J. M. Wood, 826.

Forma *laxa*—internodiis ± elongatis.

Table Mt., Schlechter, 1321; Platteklip, Z. 5076; Kampsbay, Z. 5078; Hex River Valley, Tyson, 639 (much branched in the floral region and many flowers distinctly pedicelled); Krakamma, E. and Z. 1874 (type of *Tetraphyle lanceolata*); Port Elizabeth, W. Kemsley, 182; near the Zwartkops River, E. and Z. 1873; Grahamstown, MacOwan, 1865;

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[1] This frequently looks similar to *Cr. pentandra* (Royle), Schönl. in which, however, the floral structure appears to be different.

? Aliwal North, O. Kuntze, Oct. 1894; East London, Dr Rattray, 214; Komgha, Flanagan, 889; Van Reenen, Schlechter, 6911; Drege, 6910.

21. *Crassula parvula*, Harv. in Harvey and Sonder, Fl. Cap. II, 352. (Plate V, fig. 18.)

Tetraphyle parvula, E. et Z., Enum. no. 1871, 294.

Perennis radicibus fibrosis caule ramisque basi lignosis valde ramulosis. Ramuli elongati vel saepius abbreviati. Rami ramulique elongati fastigiati, totum foliosi. Folia in ramulis elongatis novellis quadifariam imbricata deinde remota, subconnata ovato-lanceolata obtusa vel subacuta internodiis quam folia parum brevioribus. Flores pentameri minuti subsessiles in cymis paucifloris ex axillis foliorum superiorum. Calyx quam corolla parum brevior. Sepala connata, tubo circ. 1/3 longitudine loborum, lobis lanceolatis. Petala erecto-patentia sublibera pallide albo-viridia ovata. Stamina quam calyx parum breviora filamentis albis subulatis, antheris ovatis luteis. Carpidia quam stamina parum breviora ovariis oblique subovatis 2-ovulatis stilis brevissimis subulatis. Squamae basi breviter stipitatae sursum dilatatae rotundatae et leviter emarginatae.

The description was drawn up from a live specimen collected at Grahamstown, Feb. 1916. To this the following measurements also refer. I must, however, repeat the caution that the plant flowers often very early, long before the base of the stem has become lignified, and it then looks like an annual.

Height of plant 3—10 cm. Branches 8 cm. long, elongated branchlets about 5 cm. long. Lowest leaves about 3 mm. long, upper very gradually smaller. Petals about 1 mm. long. Sepals very slightly, though distinctly shorter.

Kirstenbosch, H. H. W. Pearson, 52; Wynberg, Schlechter, 561; Table Mt., (?) Z. 638 in Herb. Alb. Mus.; ? Kampsbay, Z. 5079; Constantia Mt., Schlechter, 869; Muizenberg, Bolus, 4822; Uitenhage, Schlechter, 2583; Grahamstown, E. and Z. 1871, MacOwan, 554, Schlechter, 2260, Schönland, 470, 613; Murraysburg, Tyson, 408; East London, Galpin, 6616; Doodmanskrans, Barkly East distr., E. E. Galpin, 6619; Basutoland, Dieterlen, 166; ? Van Reenen, Schlechter, 6911.

22. *Crassula transvaaliensis*, O.K. Ms. in Herb. Berol. (Plate V, fig. 19.)

Crassula subulata (Hook.), Harv. (non Linn. nec E. et Z.), in Harvey and Sonder, Fl. Cap. II, 352.

Thisantha subulata, Hook. in Ic. Pl. (1843), t. 590.

Tillaea subulata, Benth. et Hook. f. in Gen. Plant. I, 658; Britten in Oliver, Fl. of Trop. Afr. II, 367; Hiern in Pl. Welwitsch. I, 325.

Perennis caule basi lignoso incrassato valde ramoso ramis virgatis totum foliosis, subtetragonis glabris vel rarius pubescentibus. Folia viridia vel glaucescentia erecta vel patentia subulata acuta vel e basi oblongo-lanceolata applanata rigida glabra vel interdum basi marginibus scabris vel ciliatis. Flores minuti in cymis congestis quam folia multo brevioribus axillaribus brevissime pedicellati. Calycis lobi longitudine corollae subaequales subulato-lanceolati acuti. Petala basi connata oblonga vel ovato-oblonga acuta. Carpidia staminaque quam petala breviora. Ovaria 2-ovulata, stilis subulatis brevibus. Squamae spathulatae.

As in the previous species the plant may flower at a very early stage, and in that case it has the appearance of an annual which is often, especially in dried specimens, not easily to be distinguished from *Cr. campestris* (E. et Z.), Harv.

It extends from the eastern part of Cape Colony to Natal, the Transvaal and East Tropical Africa, reaching the island of Socotra. It is also found in the territory until recently known as German S.W. Africa and in Angola. Some variations are noted with the records of specimens I have examined.

Height of plant 3—20 cm. Leaves 6—12 mm. long, 1—2 mm. wide.

(*a*) With somewhat flexuous branches, internodes about the length of the leaves. Leaves about 6 mm. long. Flowers frequently solitary.

Tandjesberg near Graaff Reinet, Bolus, 804; Queenstown, E. E. Galpin, 2584; Broughton near Molteno, Flanagan, 2224; Basutoland, Mrs Dieterlen, 166*a*; Indwe, T. R. Sim, 2752; Drakensberg, source of river Injansuti, M. Evans, 639; Pietersburg, Bolus, 10896; Caledon river, Burke, 218; Doornkop, Burke, 219; Groenberg, Natal, J. M. Wood, 583.

(*b*) More rigid, internodes much shorter than the leaves; leaves scabrid or ciliate on lower portion, about 1 cm. long. These agree on the whole with the type of *Cr. transvaaliensis*, O.K.

Tsitsa River, Schlechter, 6380; on rocks near Noodsberg (flowers yellow), Wood, 826; Van Reenen, Wood, 9803; Fairfield, Alexandra county, Rudatis, 211; Estcourt, Schlechter, 3356; Claremont, Natal, Schlechter, 3053; Johannesburg, O. Kuntze and Galpin, 1393; Rustenburg, Miss Malcom, 144; Middelburg, Transvaal, Transv. Mus. Herb. 8249; Lydenburg, Wilms, 473; Wonderboompoort, Leendertz, 473; Pietersburg, Bolus, 10896.

23. *Crassula bergioides*, Harv. in Harvey and Sonder, Fl. Cap. II, 352. (Plate VI, fig. 20.)

Crassula pusilla, Schönl. in Rev. Alb. Mus. II (1913), 451.

Herba annua pusilla simplex dense foliosa. Folia connato-perfoliata rubra subplana subcarnosa ovata acuta apice breviter aristata marginibus albidis minutissime papillosis intus concava extus convexa. Flores pentameri breviter pedicellati inferiores ex axillis foliorum solitarii superiores in dichasia 3-flora dispositi; bracteae foliis similes sed minores. Sepala basi connata lanceolata margine minutissime papilloso-ciliata apice aristata. Petala alba ovata obtusa sepalorum longitudinem subaequantia. Filamenta subulata, antherae parvae luteae late oblongae. Ovaria multi-ovulata late et oblique ovata margine ventrali laevi, dorsali apicem versus papillosa, in stilum brevem subulatum sensim contracta. Squamae minutae stipitato-obcuneatae apice sub-truncatae.

Height of plant 5—12 mm. Leaves (without the short awn) about 6 mm. long, about 4 mm. broad. Calyx tube about ·25 mm. long, lobes about 2 mm. long, awn of calyx ·5—·75 mm. long.

The description with measurements was taken from some specimens found by me in Sept. 1910, on a dry plain close to the town of Worcester; which I described as *Cr. pusilla.* I have not seen the type of *Cr. bergioides*, Harv., but Harvey's description agrees with our plant sufficiently to allow of the conclusion that my *Cr. pusilla* must be sunk in it. The species was found at the Breede River by Zeyher (no. 2515). Schlechter, 1587 and 1805, from Malmesbury and Riversdale, must also be referred to it. According to Schlechter it is widely spread from Caledon to Mossel Bay.

24. *Crassula aristata*, Schönl. in Engl. Bot. Jahrb. XLIII (1909), 362.

Annua (?) glabra laxe ramosa, ramis brevibus. Folia lanceolata margine minutissime denticulata ceterum glabra apice breviter aristata. Flores inferiores pentameri ex axillis foliorum solitarii, superiores in dichasia pauciflora dispositi, bracteae foliis similes sed minores. Sepala lanceolata aristata margine minutissime ciliata quam petala triplo longiora. Petala late ovata obtusa. Stamina et carpidia petalorum circ. 2/3 longitudinem aequantia, filamentis subulatis, antheris late oblongis, ovariis margine ventrali papillosis late et oblique ovatis multi-ovulatis in stilum brevem subulatum contractis. Squamae....

Height 10 cm. Lower leaves circ. 12 mm. long, lower internodes a little longer, the upper leaves and internodes gradually shorter. Calyx lobes 3·5—4 mm. long, petals about 1/3 this length. Longest pedicels about 5 mm. long, the lateral pedicels of the dichasia much shorter.

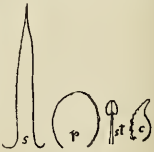

Fig. 14.

Only one specimen known which is in the Herb. of the Berlin University and marked "Crassula, Cap. b. spei, Hort. Berol., Jul. 1846, 199 (46)."

25. *Crassula lycopodioides*, Lam. Encycl. II, 173; DC. Prodr. III, 385; Harvey in Harvey and Sonder, Fl. Cap. II, 351. (Plate VII, fig. 26.)
Cr. imbricata (Solander) in Ait. Hort. Kew. I, 393. (1789); now Burm. f. (1768)
?~~*Cr. muscosa*, L. sp. 405 (ex DC.), Pl. Afr. Rar. 10 (ex Ind. Kew.)~~.
Cr. muscosa, Thunb. in Fl. Cap. ed. Schultes, 281; non Linn. = T. polpodacea E+Z.
Cr. muscosa, Drege (ex Harvey).
Cr. lycioides, E. Mey. (ex Harvey).
distinct *Cr. anguina*, Harv. in Harvey and Sonder, Fl. Cap. II, 350.
Tetraphyle lycopodioides, E. et Z. in Enum. no. 1870, 294.
distinct *T. polpodacea*, E. et Z. l.c. no. 1869, 293.
T. littoralis, E. et Z. l.c. no. 1867, 293.
T. propinqua, E. et Z. l.c. no. 1868, 293.

(*Crassula pseudolycopodioides*, Dinter et Schinz in "Dinter, Deutsch Süd West Afrika" may belong here, but I have seen neither a specimen nor the description.)

Suffruticosa. Caulis irregulariter ramosus foliis quadrifariam imbricatis undique tectus vel basi nudus erectus vel subdecumbens. Rami ramulique cauli similes subfastigiati vel ramuli multi abbreviati. Folia glabra ovata sessilia subdistincta subtus subconvexiuscula supra subplana. Flores minuti pentameri sessiles ex axillis foliorum superiorum solitarii vel in cymis paucifloris. Calyx quam corolla 1/3 brevior lobis ima basi connatis sublanceolatis obtusis. Petala alba vel purpurascentia basi connata lobis late oblongo-lanceolatis obtusis marginibus inflexis. Stamina carpidiaque calyce subaequilonga. Filamenta basi tubo corollae adnata, antherae ovatae. Stili subulati quam ovaria pluriovulata parum breviores. Squamae obcuneatae apice rotundatae.

Height of plant usually 20—30 cm. Leaves 2½—4 mm. long. (They have an almost flat upper surface. On the back they are bevelled on the margin, the remainder of the back is nearly flat again. The bevelled edge is minutely punctate.) Calyx about 1 mm. long. The tube of the corolla is about ·4 mm. long, the lobes 1·1 mm. The stamens and carpels are about 1 mm. long.

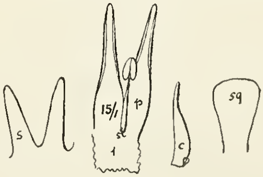

Fig. 15.

This species is found from Namaqualand to Naauwpoort and along the coast to Komgha. It is generally found in very dry stony locali-

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ties. Towards the East the plants become more slender and have smaller leaves than in the West.

I have examined one of the types of *Cr. anguina*, Harv. (Z. 641). The author says that it is larger, with the leaves closely appressed. I have grown for years specimens from Namaqualand which agree exactly with the type, but neither the plant itself nor the leaves are larger than other specimens belonging undoubtedly to *Cr. lycopodioides*, in fact they agree in every particular except that in some of the Namaqualand specimens the leaves have no abbreviated axillary shoots and consequently they are not forced apart.

I see, therefore, no reason to retain *Cr. anguina*, Harv. as a separate species. I agree with Harvey in uniting the various species of Ecklon and Zeyher which I have quoted, and I find it even difficult to separate the varieties which Harvey has instituted. (Compare Schönland in Ann. S. Afr. Mus. IX, 51.) In addition to the specimens quoted (which will sufficiently indicate its range) I have examined numerous others.

This species connects the "*Tillaeoideae*" with the subgenus *Pyramidella*.

Groot Riet, Harteveldt, Z. 641 (type of *Cr. anguina*, Harv.); Kamiesberge, E. and Z. 1868; Clanwilliam, Diels, 1148 ("flowers brownish red, the whole plant brownish green"); Saldanha Bay, E. and Z. 1867; Capeflats near Papenburg, H. Bolus sine no. in Herb. Bolus; Matjesfontein, Dr Purcell; Gauritz River, Swellendam, E. and Z. 1870; Swanepoolpoort, Marloth (with rather small pointed leaves); Naauwpoort, T. R. Sim, 6; Willowmore, D. Smit; Heerelogement, Z. 643; Langekloof, Schlechter, 8037 (= Mund et Maire, Sept. 1820 in Herb. Berol.); Koegakamma Kloof and Kommando Kraal, Z. 250, 639, 640, 642, 2519; Krum River, Humansdorp, E. and Z. 1869; Redhouse, Mrs T. V. Paterson, 89; Grahamstown, MacOwan, 1806; Adelaide, Mrs H. Hutton; Komgha, Flanagan, 1775 (= Z. 1869).

Cr. muscosa, Th., Drege in Herb. Berol. belongs to Harvey's variety *polpodacea*.

26. *Crassula Dodii*, Schönl. et Bak. fil. in Journ. of Bot. XXXVI (1898), 372. (Plate VI, fig. 21.)

Annua radice tenuissima. Caules plures ex eadem radice orti, adscendentes filiformes subsimplices vel parum ramosi 2—3 cm. longi. Folia radicalia spathulata vel ovata obtusa, caulina spathulata vel oblanceolata, omnia petiolata basi ± gradatim in petiolum attenuata internodiis breviora. Flores pentameri caulium apices versus ± aggregati, pedunculi pedicellique gracillimi. Sepala ovata vel oblongo-ovata obtusa quam petala breviora. Petala oblongo-ovata. Ovaria

oblique obovata multi-ovulata. Stili breves. Squamae anguste obcuneatae apicem versus dilatatae truncatae.

It seems that this plant has by Harvey been mixed with *Crassula brevifolia* (E. et Z.), Schönl. See remarks in Journ. of Bot. XXXVI (1898), 372. The two are, however, perfectly distinct.

Branches 2—3 cm. long. Petioles 2—4 mm., blades 1·5—3 mm. long. Pedicels ·5—2 mm. long. Petals 1·5 mm. long.

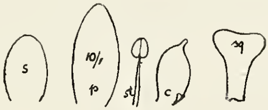

Fig. 16.

On the hills near Van Rhynsdorp, 100 m., Schlechter, 10994.

27. *Crassula umbellata*, Thunb. in Fl. Cap. ed. Schultes (1823), 279; DC. Prodr. III, 389. (Plate VI, fig. 22.)

Tillaea umbellata, Willd. Sp. pl. I, 271.
Crassula alpina, Endl. in Walp. Rep. II, 253.
Petrogeton alpinum, E. et Z. Enum. no. 1858, 291.
Bulliarda alpina, Harv. in Harvey and Sonder, Fl. Cap. II, 330.
Crassula umbella, E. Mey. in Herb. Drege (ex Harvey).

Annua, radix fibrosa tenuissima, caulis brevis simplex vel rarius ramosus tenuis glaber filiformis apice umbellifer. Folia radicalia aggregata subpetiolata obovato-spathulata vel flabelliformia papillosa obtusissima. Flores tetrameri vel rarius pentameri subumbellati plurimi ex apice caulis pedunculo brevi, pedicellis inaequalibus capillaribus rectis. Calyx quam petala paullum brevior superne extus pubescens tubo brevi laciniis ovatis obtusissimus. Petala ovata obtusa incarnata. Filamenta subulata erecta longitudine laciniarum calycis. Antherae flavae ovatae. Ovaria ovata acuta 6-ovulata. Stili breves subulati. Squamae subspathulatae.

Height 1—4 cm. Leaves 2—3 mm. long, 1—2 mm. broad. Petals about 1·5 mm. long. Pedicels 3—8 mm. long.

Although the plant in a few particulars differs slightly from Thunberg's description, there can be no reasonable doubt that the identification is correct and that *Petrogeton alpinum*, E. et Z. is identical with *Crassula umbellata*, Thunb. It flowers in August and September.

Near the "Kloof" on Table Mt., E. and Z. 1858; ledges of rock, Orange Kloof, Cape Peninsula, 1800 ft, Wolley Dod, 3366; dry sandy ground Betseta rock, Cape Peninsula, 500 ft, Wolley Dod, 3366; damp places on top of Muizenberg Mt., Herb. Norm. Austr. Afr. 1150.

In the two following the plant is somewhat larger than usual, and the stem dichotomously branched: Darling, Malmesbury distr., Bachmann, 428; on rocky hills near Hermanuspietersfontein near Caledon, L. Kensit in Herb. Bolus, 9862.

var. *nana*, Schönl. (*Crassula nana*, Schönl. et Bak. fil. in Journ. of Bot. Oct. 98, 372). Planta ad 1 cm. alta pedicellis brevibus. Calyx corollae subaequilongus. Western Region. Zuurfontein (alt. c. 50 m.), Schlechter, 8560.

28. *Crassula Marlothii*, Schönl. in Journ. Linn. Soc. (Bot.) XXXI (1897), 553. (Plate VI, fig. 23.)

Annua acaulescens stolonifera glaberrima. Folia rosulata omnia radicalia longe et tenuissime petiolata laminis obovatis vel orbicularibus in petiolum attenuatis. Flores sub-umbellati ex axillis foliorum vel in cymis paucifloris longissime et tenuissime pedicellati pentameri stellati. Sepala ovata basi connata. Petala rosea sublibera ovato-lanceolata acuminata quam sepala triplo longiora. Stamina quam petala paullum breviora filamentis filiformibus antheris late ovatis. Ovaria 4-ovulata stilis quam ovaria paullum brevioribus subulatis. Squamae minutae truncatae.

Length of leaves 10—15 mm., of their blades about 2 mm. Pedicels 2·5—4 cm. long. Petals about 2 mm. long.

On shady, rocky places of the Matroosberg, 4500 ft, Dr R. Marloth, 2202.

This species appears to lead up to *Cr. dentata*, Thunb.

It is not impossible that it is identical with *Crassula minima*, Thunb. (Prodr. 57, Fl. Cap. ed. Schultes, 292.) However, no original specimen of the latter seems to exist. Harvey could not place it. I have not seen E. and Z., 1896 which the collectors found on Table Mountain and identified with this species. The following is Thunberg's description in Fl. Cap. (ed. Schultes), 292:

"C. (*minima*) foliis petiolatis, subrotundis, integris; pedunculis unifloris."

"Crescit in rimis intimis umbrosis montium Rode Sand et Bockeveld frigidioris dicti. Floret Septembri, Octobri. Planta minima, tenerrima, tota glabra. Folia glabra, diffusa, lineam longa. Petiolus filiformis, pollicaris. Caulis brevissimus vel subnullus. Pedunculi subradicales, capillares, uniflori. Petala semper 5. Filamenta saepius 5, rarius 4, rare 6. Capsulae et stili 5, rarissime 4, cum staminibus totidem ovatae, acutae, conniventes."

29. *Crassula silvatica*, Licht. in Schult. System. VI, 726; DC. Prodr. III, 390. (Plate VI, fig. 24.)

Cr. pellucida, Thunb. (non Linn.) in Thunberg, Fl. Cap. ed. Schultes, 282.

? *Cr. strigosa,* Linn. Amoen. VI, 86; DC. Prodr. III, 389 (non Lam. ?).
Cr. pubescens, Endl. in Walp. Rep. II, 252 (ex Ind. Kew.).
Cr. diaphana, a. Drege (ex Harvey).
Cr. Sarcolipes, Harv. in Harvey and Sonder, Fl. Cap. II, 355.
Sarcolipes pubescens, E. et Z. in Enum. no. 1853, 290.

Annua. Caulis herbaceus carnosus diffusus ramosus erectiusculus pubescens. Folia opposita subconnata carnosula applanata obovata obtusa pubescentia vel glabra margine tenuissime ciliata. Flores roseo-albi pentameri inferiores axillares vel in dichotomis ramulorum terminales, superiores subumbellati pedicellati, pedicellis capillaribus villosis foliis brevioribus. Calycis lobi basi connati lanceolato-oblongi subacuti pubescentes corollae subaequilongi. Petala sublibera ovata acuta incarnata stellata. Stamina quam corolla breviora antheris flavis. Ovaria multi-ovulata, stilis brevibus subulatis. Squamae lineares.

A small herb with lax growth 5—10 cm. high. Internodes 1·2—2·4 cm. long. Leaves 1—2 cm. long, 6—8 mm. wide. Petals about 2 mm. long on hairlike pedicels 1—1·5 cm. long.

Endlicher's name cannot be adopted for the species as there is already a *Cr. pubescens,* L. f. I think Thunberg was mistaken when he identified his plant with *Cr. pellucida,* L. I have not seen Lichtenstein's description, but his specimens in the Berlin Herbarium prove the identity of his species with *Cr. Sarcolipes,* Harv. The description of *Cr. strigosa,* L. is insufficient for identification.

Above Orange Kloof, Table Mt., Schlechter, 1320; Camps Bay, Z. 114, 5073; Zeekoe Vley, Schlechter, 8504; near Clanwilliam, Diels, 289, 331 and 331*a*, E. and Z. 1853; Witsenberg (Tulbagh), Z. ? sine no. in Herb. Berol.; Forest near Swellendam, Lichtenstein in Herb. Berol.; Prom. b. sp., Drege in Herb. Berol.

Harvey also records the plant from Simon's Bay and Piquetberg, etc., Thunberg from Paarl and Paardeberg, Mosselbay, Zwartland and elsewhere.

30. *Crassula diaphana,,* E. Mey. in Harvey and Sonder, Fl. Cap. II, 355.
? *Cr. inanis* (Th. a.), E. Mey. in Herb. Drege.

"Herbacea. Caulis dichotome ramosus diffusus gracilis pubescens. Folia remota opposita subconnata ovata basi attenuata pubescentia plana. Flores pedicellis filiformibus inferiores solitarii, superiores laxe fasciculato-subumbellati. Calycis lobi quam petala dimidio breviores hispido-pubescentes oblongi obtusi. Petala connata obovata-oblonga. Stili breves subulati."

"A slender herb 7·5—15 cm. high. Internodes 2·4—4·8 cm. long. Leaves 1·2 cm. long, 4 mm. broad, membranous when dry. Flowers 2 mm. long. Near *Cr. Sarcolipes,* but with different flowers." "Between Nieuwkloof and Slangenkeuwel, Drege" (ex Harvey).

This species is not sufficiently known to me. There are a few specimens in the Berlin Herbarium marked in the usual handwriting on the labels of Drege's specimens "*Crassula inanis* (Th. a.) E. Mey., Drege, C.B. Sp." which seem to have the obtuse sepals and petals of this species and otherwise agree with it, except that in fully developed flowers the sepals are nearly the length of the petals. Without practically destroying the specimens it is hardly possible to decide whether it really is the above species and whether it can be kept distinct from *Cr. silvatica,* Licht.

31. *Crassula peploides,* Harv. in Harvey and Sonder, Fl. Cap. II, 355.

"Perennis. Herbacea carnulosa decumbens e basi ramosa totum foliosa ramis brevibus ad nodos radicans. Folia connato-perfoliata patentia carnosa glabra oblonga obtusa. Flores parvi in cymis paucifloris ex axillis foliorum superiorum et terminales. Lobi calycis oblongi glabri carnosi petalis oblongis subaequilongis" (ex Harv. l.c.).

This according to Harvey is a small perennial species with the general aspect of *Arenaria peploides.* Leaves 6—10 mm. long, 2·4—4·8 mm. wide. Mature corolla not seen by him. I have not seen a specimen. In Journ. of Bot. XXXVI (1898), 372, Mr Baker and myself identified with it a specimen collected by Mr T. R. Sim on the Windvogelsberg near Cathcart. This, I think now, was a mistake.

32. *Crassula corallina,* Thunb. in Nova Acta, VI (1778), 334, Prodr. 56 and Fl. Cap. ed. Schultes, 290; Linn. Syst. Veg. XIV, 306; L. f. Suppl. 188; Willd. Sp. pl. I, 1549; DC. Prodr. III, 188; Harvey in Harvey and Sonder, Fl. Cap. II, 366; Britten and Baker f. in Journ of Bot. 480[1]. (Plate VII, fig. 25.)

Cr. dasyphylla, Harv. in Harvey and Sonder, Fl. Cap. II, 355.

Cr. Simiana, Schönl. in Journ. Linn. Soc., Bot. XXXI (1897).

Perennis radice fusiformi caule decumbenti valde ramoso ramis suberectis ramulosis fastigiatis internodiis brevibus vel brevissimis. Folia crassa subdistincta sessilia carnosa subellipsoidea vel subglobosa obtusissima apice pulverulento-alba, punctis viridibus impressis, quam internodia longiora. Flores pentameri in cymis terminalibus paucifloris subsessiles vel pedicellati pedicellis filiformibus. Calycis lobi ima basi connati oblongi obtusi dorso convexi saepius extus pulverulento-albi. Petala alba sublibera erecta oblongo-ovata vel ovata obtusa quam sepala subduplo longiora. Stamina quam petala multo breviora, filamentis brevibus, antheris ovatis, stilis subulatis brevibus. Squamae subrectangulares apice rotundatae interdum leviter emarginatae.

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[1] I have already pointed out in Ann. S. A. Mus. IX, 51 that *Tetraphyle corallina,* E. et Z. has nothing to do with this species. It is *Anacampseros ustulata,* E. M.

Height of plant 5—7 cm. Leaves 2—4 mm. long. Pedicels up to 4 mm. long. Petals 1·5 mm. long.

I am quite satisfied now that my *Cr. Simiana* cannot be specifically separated from *Cr. corallina* (for some notes on this plant see Schönland in Journ. Linn. Soc., Bot. XXXI, 1897). This species leads up to *Cr. deltoidea*, L. and allied species.

Thunberg's plant was found "in campis siccis Hantum inter Daanis et Roggeveldsberg." It extends from Little Namaqualand and Bushmanland to the Stormberg and southwards to the neighbourhood of Somerset East. Pearson notes that it grows in sandy places.

Little Namaqualand, Richtersfeld, Stinkfontein, Pearson, 2604; Ratel Kraal, Pearson, 2611; Bushmanland, Aggenys (also at Wortel), Pearson, 2945; in carroid places near Graaff Reinet, Bolus, 620; Hanover and Stormberg, T. R. Sim; Cradock distr., F. Holland; Wolvefontein, Somerset East distr., I. L. Drege.

33. *Crassula Dregei*, (Harv.) Schönl.

Bulliarda Dregei, Harv. in Harvey and Sonder, Fl. Cap. II, 330.

Cr. prostrata, E. Mey. in Herb. Drege (ex Harvey).

? *Cr. prostrata*, Thunb. in Fl. Cap. ed. Schultes, 282.

"Caulis filiformis basi simplex sursum dichotome ramosus nodis distantibus. Folia ovato-lanceolata acuta margine scabrida plana, in sicco translucentia venata. Flores tetrameri in cyma terminali laxa, pedicellis filiformibus. Calyx profunde 4-partitus lobis lanceolatis acutis petalis lanceolatis acutis subaequalis" (ex Harvey, l.c.).

"Stem 15—24 cm. long, simple for $\frac{3}{4}$ of its length; internodes 2·4—4·8 cm. long, leaves ·6—·10 mm. long, ·4—·6 mm. wide, with purple veins. Flores 2—3 mm. long" (ex Harvey, l.c.). "Between the Omsamwubo and Omsamba, Caffr., Drege."

I have not seen the type of this species, nor have I come across a plant that fits the description. Harvey says it resembles *Cr. centauroides* in miniature, and in spite of its small tetramerous flowers, I should judge that it will probably have eventually to be classed near it. It seems to be impossible to decide whether this is Thunberg's plant. Harvey, who had seen Thunberg's Herbarium, could not place Thunberg's *Cr. prostrata*.

34. *Crassula debilis*, Thunb. in Fl. Cap. ed. Schultes (1823), 280; DC. Prodr. III, 388.

Purgosea debilis, G. Don, Syst. III, 104.

This species, which was placed by De Candolle under sect. Turgoseae, cannot be identified by me. I give Thunberg's description, with some slight verbal alterations.

"*C.* (*debilis*) caule trichotomo, rectiusculo; foliis subteretibus, concavis, papulosis.

"Floret Junio, Julio.

"Radix fibrosa. Caulis filiformis, ramosus, erectus, vix digitalis, tenerrimus, glaber, pellucidus, vena rufescente. Rami oppositi unguiculares, supremi breviores, subramulosi, patentes, foliosi, tenerrimi, glaberrimi, pellucidi, albi, vena rubra. Ramuli oppositi minimi, floriferi. Folia in axillis ramorum et ramulorum opposita, conferta, ovata, carnosa, supra concaviuscula sulco longitudinali; subtus convexa, obtusa, glabra, sessilia, integerrima. Flores axillares, oppositi et terminales, in ramis et imprimis in ramulis, pedunculati. Pedunculus vix lineam longus. Calyx sepalis basi connatis semi 5-fidus, persistens, carnosus, papulosus; laciniae ovatae, concaviusculae, glabrae, erectae. Corolla 5-petala, tubo calycis inter lacinias inserta. Petala linearia, integra, longitudine laciniarum calycis, alba, carina saepe incarnata. Filamenta 5, corolla breviora. Antherae rotundae, bisulcae. Carpidia ovata. Stilus nullus, nisi stigmata 5 divergentia. Squamae 5. Folliculae 5, ovatae acutae.

"Obs. Potius *Crassula* erit, a quo genere non differunt *Tillaeae capenses*." Thunb. Fl. Cap. p. 280.

35. *Cr. cordata*, Thunb. in Nov. Act. VI, 330 (1778) and Fl. Cap. ed. Schultes, 293; Linn. f. Suppl. 189 (1781); Linn. Syst. Veg. XIV, 306; Britten and Bak. f. in Journ. of Bot. XXXV, 480 (non Dryander in Ait. Hort. Kew. I, 396 (1789); Harvey in Fl. Cap. II, 347 et auct. plur.).

Cr. neglecta, R. et S. Syst. VI, 722 (ex Ind. Kew.).

I cannot recognise this from the description, nor does any species of Crassula from the neighbourhood of Zwartkops known to me come near it. It may be that it should not be placed into *Tillaeoideae*. Unfortunately, the flowers are not described in the following account taken from Thunberg, Fl. Cap. ed. Schultes, 293.

"*C.* (*cordata*) foliis petiolatis cordatis; floribus solitariis.

"Crescit prope Swartkop's Zoutpan, in sylvula. Floret Novembri, Decembri.

"Radix annua. Caules herbacei, debiles, sensim tenuiores, inferne foliosi, superne ramosi, carnosi, teretes, incarnati, erectiusculi, palmares. Rami in caulis supremo oppositi, capillares, patenti-erecti, glabri. Folia caulina fastigiatim opposita, rotunda, integra, reflexo-patentia, crassa, carnosa, viridia, margine punctisque rufis, frequentia, unguicularia; ramea similia sed multoties minora et tenuiora, viridia circulo punctorum intra marginem. Petioli semiunguiculares. Flores terminales, solitarii, pedunculati. Pedunculi capillares, lineam longi."

LIST OF ILLUSTRATIONS

A. TEXT FIGURES

In all text-figures s=calyx lobes, p=petals, st=stamens, c=carpels, sq=squamae.

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Fig. 2 (p. 51). *Cr. papillosa*, Schönl. et Bak. f.
Fig. 3 (p. 52). *Cr. Vaillantii* (Willd.), Schönl.
Fig. 4 (p. 53). *Cr. decumbens*, Thunb.
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B. PLATES

All figures are approximately natural size, unless otherwise mentioned.

PLATE II

Fig. 1. *Crassula natans*, Thunb. Wolley Dod, 1262 (a small specimen).
Fig. 2. *Cr. inanis*, Thunb, ½ nat. size. M. Daly and M. Sole, 137*a*.
Fig. 3. *Cr. papillosa*, Schönl. et Bak. f. Galpin, 1922. Type of *Cr. limosa*, Schönl.
Fig. 4. *Cr. Vaillantii* (Willd.), Schönl. Schlechter, 5351.
Fig. 5. *Cr. decumbens*, Thunb. Wolley Dod, 1430 (small specimen). M. Daly, 1076 (large specimen).

PLATE III

Fig. 6. *Cr. brevifolia* (E. et Z.), Schönl. MacOwan, 3160.
Fig. 7. *Cr. aphylla*, Schönl. et Bak. f. About 3 times nat. size. Note the leaves on the specimen on the left. Schlechter, 8864.
Fig. 8. *Cr. expansa*, Ait. Ecklon and Zeyher, 1883. (*Cr. filicaulis*, E. et Z.)
Fig. 9. *Cr. tenuis*, Wolley Dod. Wolley Dod, 3369.
Fig. 10. *Cr. oblanceolata*, Schönl. et Bak. f. Schlechter, 4920.

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Fig. 11. *Cr. glomerata*, Linn. Daly, 1078.
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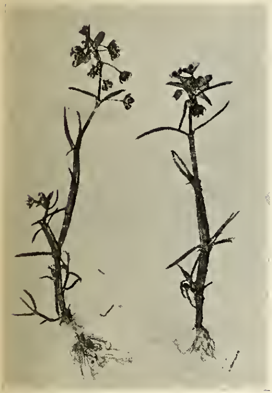
Fig. 25. *Cr. corallina*, Thunb. Bolus, 620.
Fig. 26. *Cr. lycopodioides*, Lam. ½ nat. size. D. Smit, Willowmore.



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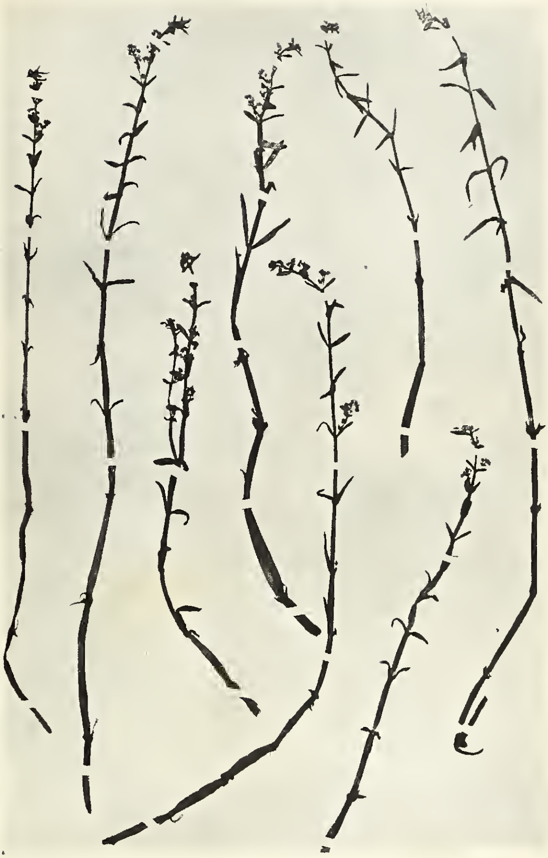

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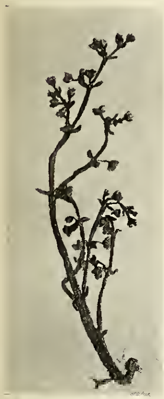

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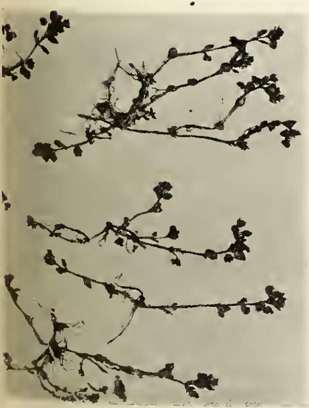

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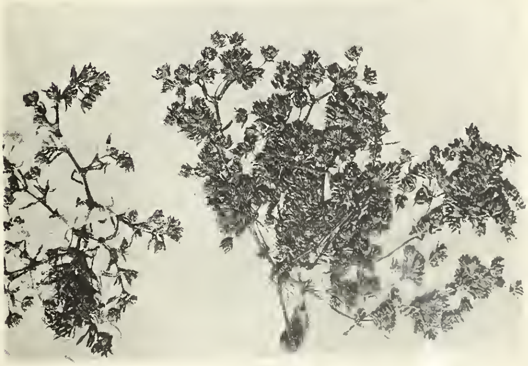

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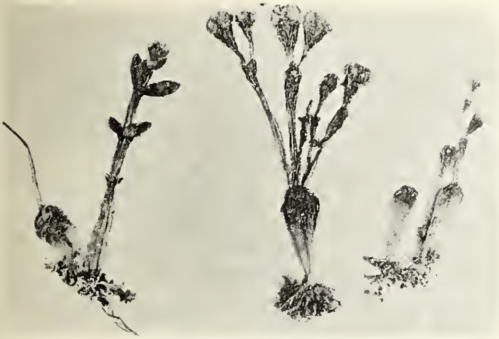

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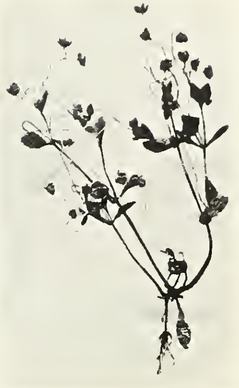

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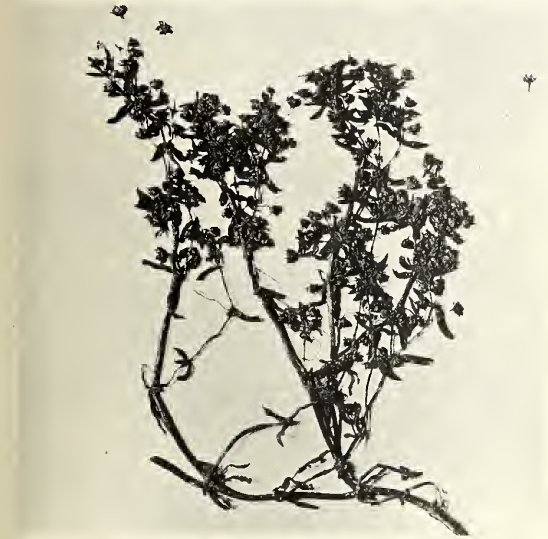

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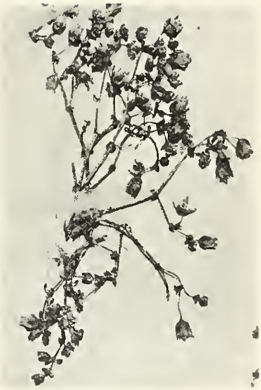

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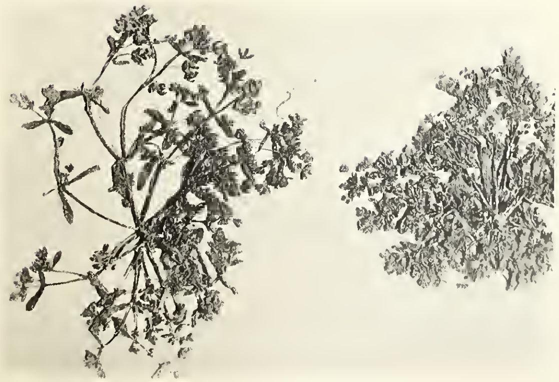

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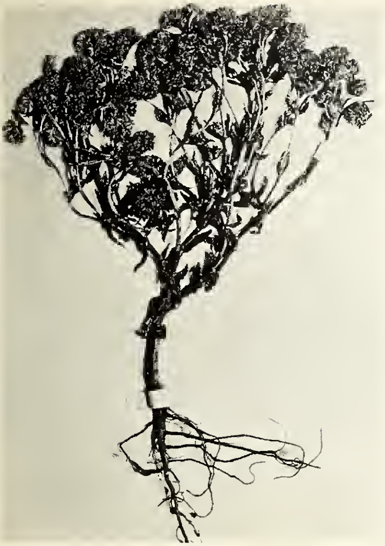

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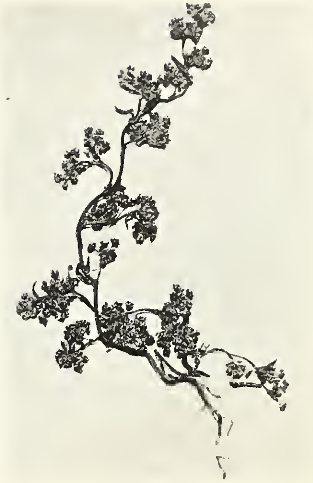

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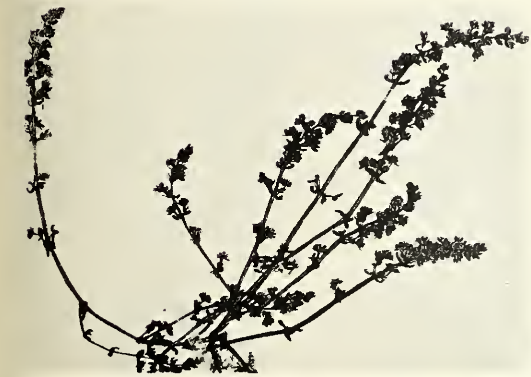

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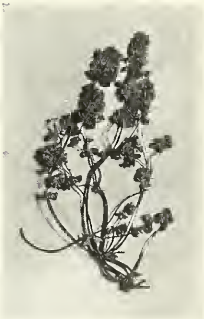

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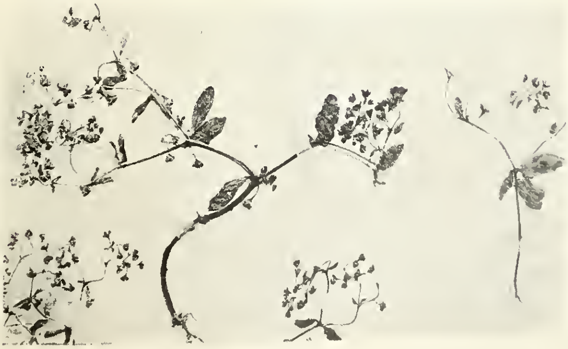

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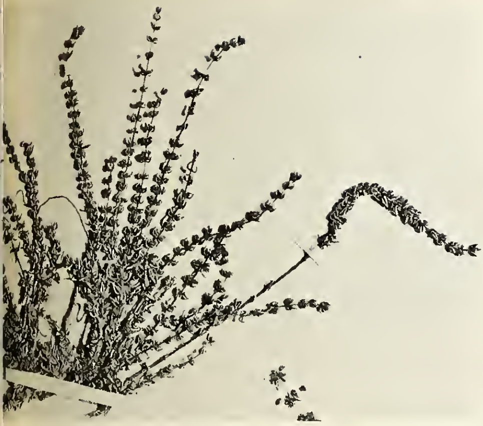

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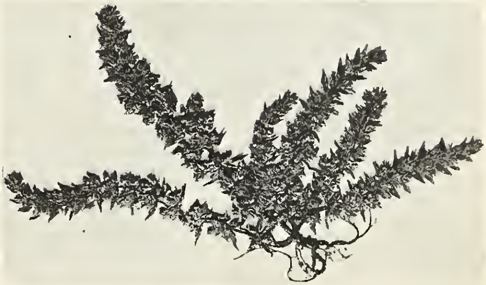

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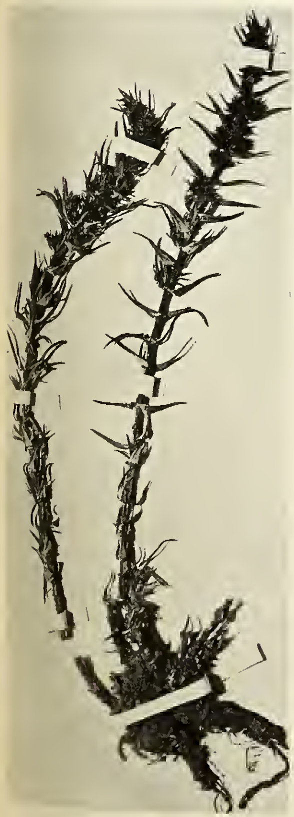

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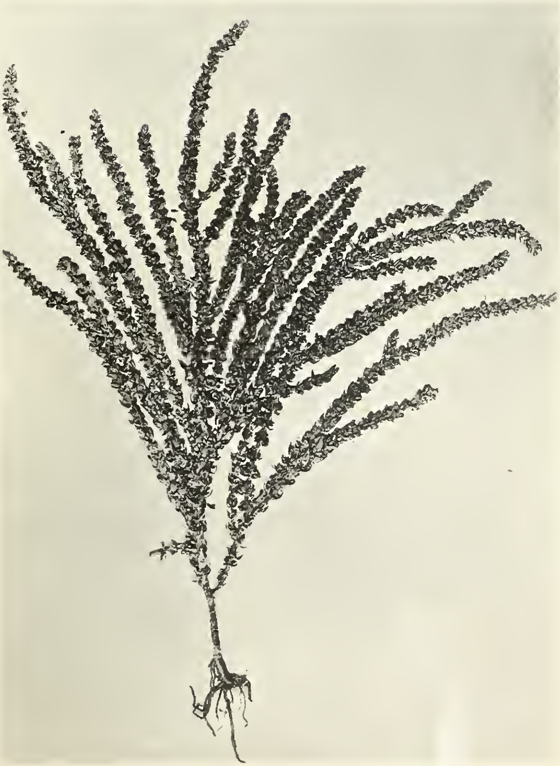

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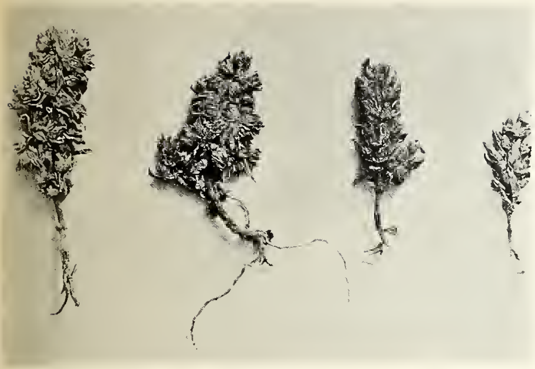

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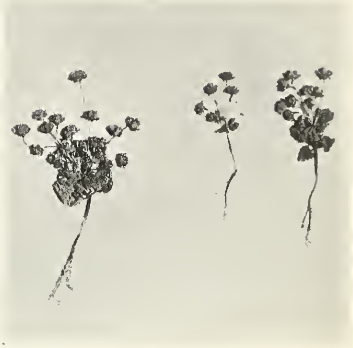

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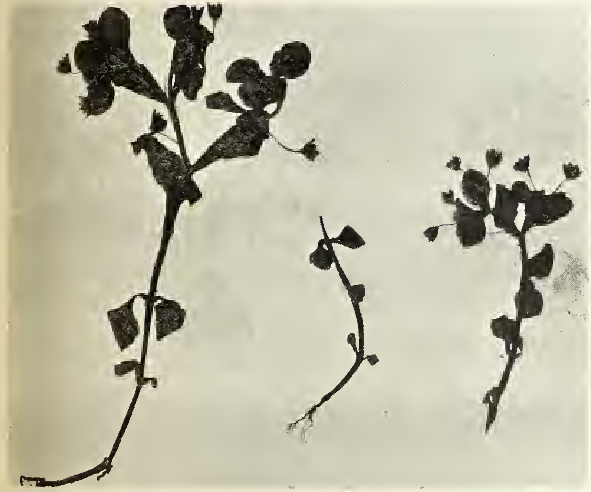
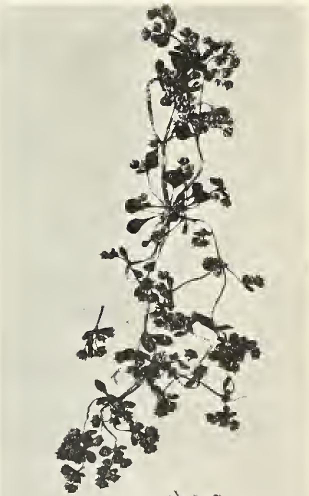


Fig. 24



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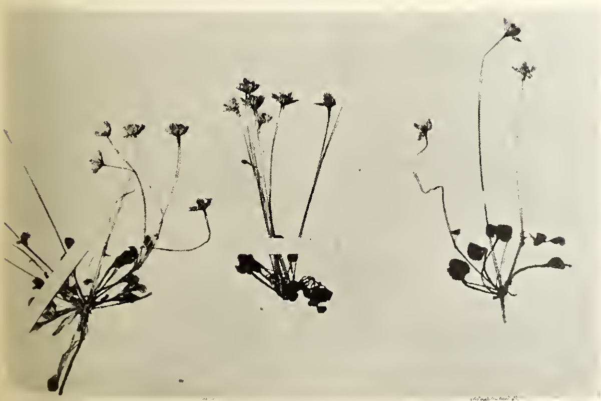

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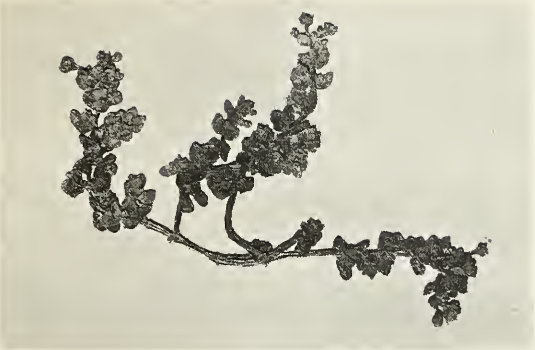
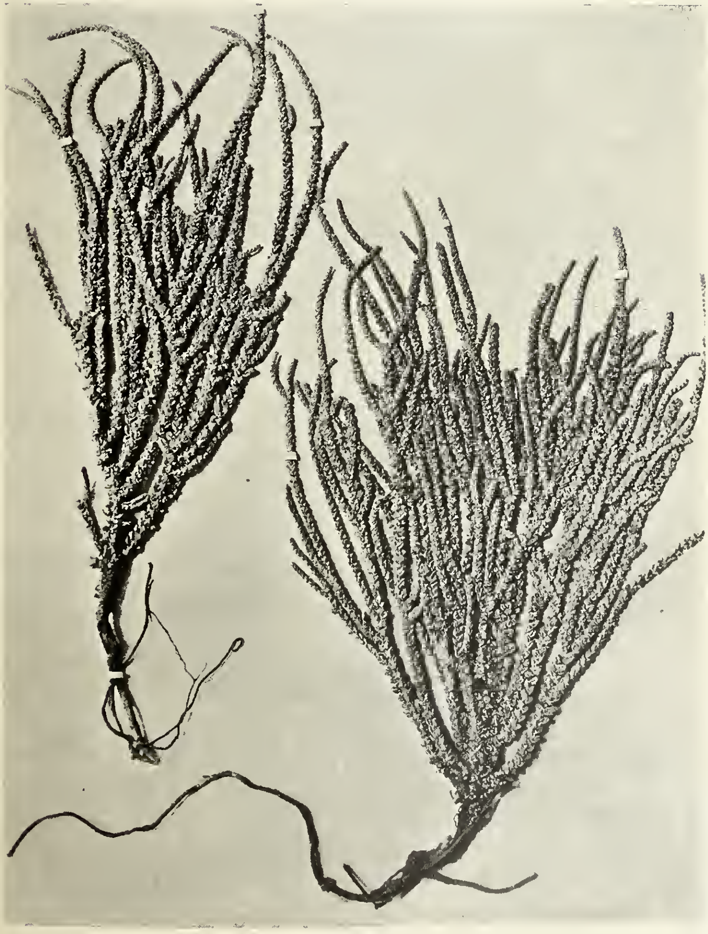


Fig. 25



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[1] T. Ecklonis Walp. Rep. II, 251 is not known to me, nor have I seen the description.

A NOTE ON THE WOOD OF *GNETUM GNEMON*

By MARY R. H. THOMSON, B.A.

Croll Scholar of the University of the Cape of Good Hope.

(*With* 1 *plate.*)

Some specimens of the wood of *Gnetum gnemon*, including pieces of an old stem 4·5 cms. in diameter, were received in this laboratory from Mr I. H. Burkill, of Singapore. Mr Burkill states that "the specimens are parts of a horizontal branch. Where these branches are joined to the trunk there are curious thickenings extending partly round the trunk as if a knotted cord were under the bark."

Existing accounts of the detailed structure of the wood of *Gnetum* either describe anomalous zones of thickening as in *G. scandens*[1] or refer to a stem with a much smaller development of woody tissue[2] than is shown by this specimen.

In the largest piece the secondary xylem extends continuously through a radius of almost 2 cms. and there is no sign of anomalous cambium[3]. Also there are no indications of annual rings, and therefore no data on which the age of the specimen may be determined.

The pith shows a diameter of 0·2 cm. and the peripheral region including phloem, cortex, and bark extends through 0·2 cm.

The medullary rays are very conspicuous and somewhat wavy in their course, broadening considerably as they reach the periphery of the wood.

Pith.

The pith consists of slightly elongated cells lignified in the region of the vascular bundles, the lignified cells showing simple pits. Starch is present in the cells of both node and internode and calcium oxalate in addition in the node. The central pith cells of the internode become disorganised.

---

[1] De Bary, 1884, fig. 233, p. 586.

[2] Duthie, 1912, p. 593.

[3] Cf. Eichler in *Pfl. fam.* p. 121.

Unbranched latex tubes with brownish contents run perpendicularly through the pith, and lignified stellate cells are found in small numbers in the internode and abundantly in the node.

Primary Wood.

The young internode shows a ring of 27 to 29 vascular bundles with no sign of centripetal wood or transfusion tracheids. The number given for *G. africanum*[1] varies from 12 to 20. Spiral elements, some showing annular thickenings, and elements somewhat scalariform are present in the protŏxylem (Plate VIII, fig. 1). In addition to these are some elements with a curious combination of scalariform thickening and bordered pits (fig. 2).

Secondary Wood.

The secondary wood consists of tracheids, vessels, lignified parenchyma and rays.

Tracheids. The length of the tracheids is about 1 mm. Bordered pits are present on the radial and tangential walls, uniseriate in the majority of cases, biseriate in a few; in the latter the pits of the two rows generally alternate. In all cases the pits are quite free from one another. The outline of the pit is circular, the mouth oblong, and the torus not well developed. This type of pore is described[2] as being a vestige of the scalariform condition. The bordered pit differs thus from that of *Ephedra*, in which the mouth is described as round and the torus well developed. Bars of Sanio which are present in *Ephedra* are here most certainly absent from the great majority of tracheids, although in one or two there was just a suggestion of their presence. They are not mentioned as occurring in *G. africanum.*

As in *Ephedra* tertiary spiral striations appear, but only once was anything seen—in a stained preparation—which might have been a resin-plate. Trabeculae were not found.

In two cases a series of tracheids in tangential section showed cellulose transverse septa giving the appearance of tracheids becoming parenchyma, and bearing out Bailey's[3] view that wood-parenchyma has been developed from tracheids. In one case a parenchymatous cell had been cut off from the end of a tracheid (fig. 3).

Vessels. In the old wood the vessels are usually 3 or 4 times as wide as the tracheids, although some have about the same diameter as the larger tracheids.

Multiseriate bordered pits, usually arranged irregularly, are present on the radial and tangential walls. The pits are quite free from one another, and occasionally fused pits are seen. Bars of Sanio and trabeculae which

[1] Duthie, 1912.

[2] Thomson, 1913, p. 18.

[3] Bailey, 1909, p. 231.

are present in the vessels of *Ephedra* are not found here. Striations, however, are present in some vessels. One large perforation is exceedingly common, although as many as 10 occur, and fusions of the perforations are seen. Transitions between bordered pits and perforations were not found in this material, but it seems evident that the perforations in the vessels have been derived from the bordered pits of tracheids. As in *Ephedra altissima* vessels are present in the node.

Wood parenchyma. The wood parenchyma is not so abundant as the tracheids. It is scattered irregularly amongst the tracheids, and often almost or entirely surrounds the vessels. The cells are lignified, uninucleate, have simple pits, and contain starch. Transverse septa are abundant and usually stain easily in Delafield's Haematoxylon. In some cases the septa show one or two lignified lumps in the middle, occasionally being entirely lignified; in a few cases simple pits occur.

In *Ephedra*[1] the parenchyma cells are often multinucleate and are identical in length and shape with the tracheids. They are described as being merely tracheids, except for their pitting, which have retained their protoplasmic contents. In a few cases only in *Ephedra* do the parenchyma cells show septa; these being typically oblique. In *G. gnemon* a row of 4 to 8 of these cells resembles a tracheid in size and shape, so that in this case septation of the tracheid to form parenchyma has gone much further than in *Ephedra* and resembles the coniferous type.

Wood Rays. The width of the rays in transverse section is from 1 to 8 cells, 3, 4 and 5 being most common. In radial section they vary in height from 4 to 60 or 70 cells, and in tangential section show a fusiform shape.

The individual cells of the ray vary much in size and shape. Some are elongated radially, others vertically, while some are almost square in section. Each cell is lignified, uninucleate, simply pitted, and contains starch and calcium oxalate crystals.

In young stems uniseriate rays start from the pith, and in their course towards the periphery of the wood the cells divide radially (fig. 4), giving first biseriate then multiseriate rays. There is evidence of the fusion of smaller rays to form compound rays, although complete fusion has not been seen in this material, probably because it is not old enough. These smaller rays, when fusing, enclose part of the wood which often contains several vessels, and when they have reached the periphery there is usually only one row of wood elements separating them, so that in older material complete fusion might reasonably be expected.

Tangential sections show that many of the rays are intersected by xylem parenchyma (fig. 6), and in old stems uniseriate rays are found which do not arise from the pith, but amongst the elements of the wood.

---

[1] Thompson, 1912.

In the region of the phloem the rays are unlignified, and small fusiform rays 1 or 2 cells in width and several high, like those described for *G. africanum*[1], are present in the phloem.

Phloem.

The sieve tubes are arranged in radial rows and have large compound sieve plates on their very oblique end walls. On the radial walls sieve areas are found fairly widely apart. In this material very little callus has been formed.

The albuminous cells are arranged in radial rows between the sieve tubes, and contain starch grains. Their cross-walls are for the most part transverse, sometimes oblique.

The outer zone of the phloem in old stems is not functional, some of the cells becoming very much sclerified. These occur in groups surrounded by collapsed cells, and contain large crystals. The nature of these crystals has not been determined, but is under investigation. They are probably identical with those crystals described as crystal sand[1].

Mr Burkill, in his letter, quotes the following extract from Marsden's *History of Sumatra*: "The bagu tree (*Gnetum gnemon*) abounds on the southern coast of the island, where its bark is beaten, like hemp, and the twine manufactured from it is employed in the construction of large fishing nets." This can refer only to the sclerified cells in the phloem and cortex.

Epidermis, Cortex, etc.

The epidermal cells are papillate and possess a thick cuticle. Fibres are present in the cortex of young stems, and amongst the parenchyma inside and outside the sclerenchymatous zone in the cortex of old stems. They are very long and have pointed ends, and their thickening is white and shiny.

In young stems there is an irregular ring of lignified parenchyma cells with simple pits a few cells beyond the phloem. In old stems these cells become sclerified and form a broad zone in the cortex. Outside this zone occasional masses of sclerified cells are found scattered in the parenchyma. There is no indication of groups of fibres surrounded by cork as described for *G. africanum*[2].

Latex tubes are present in the cortex of both node and internode and lignified stellate cells in the cortex of the node.

The origin of the cork (fig. 7) differs from that of *G. africanum*[2] in being subepidermal, not epidermal. The cork at first appears as small roundish dots irregularly distributed on the stem.

In conclusion I desire to express my thanks to Dr Pearson for handing over the material to me for investigation, and for much helpful advice with regard to the work.

[1] Duthie, 1912.

[2] Duthie, 1912.

SUMMARY.

The internodes examined showed from 27 to 29 vascular bundles in the ring with no centripetal wood or transfusion tracheids. Secondary thickening is normal and annual rings are absent.

The pith is parenchymatous with a lignified zone in the region of the vascular bundles. The cells contain starch, and calcium oxalate in addition in the node. Latex tubes and stellate cells are present, and the central cells of the internodal pith become disorganised.

The primary xylem shows spiral elements, some with a few annular thickenings, scalariform elements, and elements showing a combination of scalariform thickening and bordered pits.

The tracheids show usually uniseriate pitting, the outline of the pit being circular, the mouth oblong, and the torus not well developed. Striations are present, but bars of Sanio, trabeculae, and resin plates appear to be absent. Occasionally a transverse septum was found in a tracheid.

In the vessels the multiseriate bordered pits are irregularly arranged. One large perforation is oftenest found, but several occur, and fusions of the perforations are seen. Striations are present in a few vessels, but bars of Sanio and trabeculae are not.

The ray cells are lignified and simply pitted and contain starch and calcium oxalate crystals.

Uniseriate and multiseriate rays are present, the latter being formed by radial division of the uniseriate rays and by fusion of smaller rays.

Xylem parenchyma is abundant, but not equal in amount to the tracheids. The cells are lignified, uninucleate, and contain starch. Septa are numerous and mostly cellulose. These cells have probably been developed from tracheids.

The phloem is composed of radial rows of sieve tubes and of albuminous cells, the former having compound sieve plates on their oblique end walls and sieve areas on their radial walls. Part of the phloem which is not functional becomes sclerified.

The epidermal cells are papillate and possess a thick cuticle.

Latex tubes and fibres are found in the cortex with the addition of lignified stellate cells in the node.

Also there is a zone of sclerified cells outside the phloem region.

The cork originates in the subepidermal layer.

BOTANICAL LABORATORY,
SOUTH AFRICAN COLLEGE,
May, 1916.

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EXPLANATION OF PLATE

PLATE VIII

Fig. 1. Element of protoxylem, somewhat scalariform. × about 550.

Fig. 2. Elements of protoxylem showing combination of scalariform thickening and bordered pits. × about 550.

Fig. 3. Parenchyma cell containing starch, cut off from end of tracheid. × about 550.

Fig. 4. Medullary ray in transverse section showing radial division of the cells. Single row towards the pith. × 246.

Fig. 5. Medullary ray in transverse section enclosing one row of wood elements. × 250.

Fig. 6. Medullary ray in tangential section; fusiform in shape and enclosing xylem parenchyma and a tracheid. × 63.

Fig. 7. Showing origin of cork from layer under the epidermis. × 260.

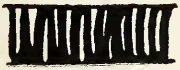

Fig. 1

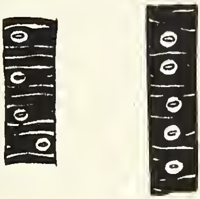

Fig. 2

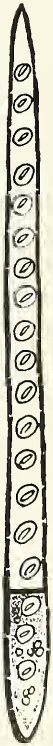

Fig. 3

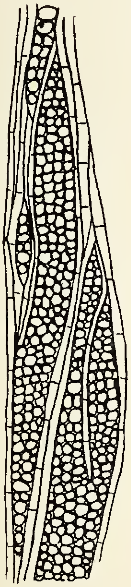

Fig. 6

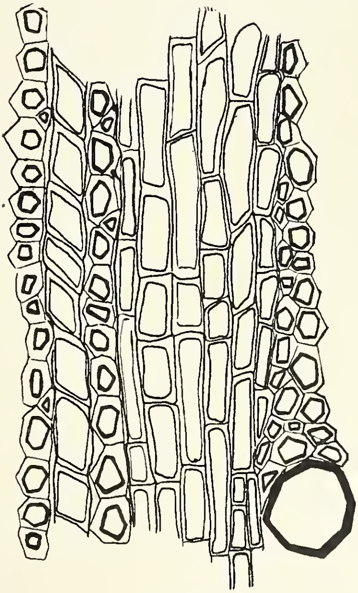

Fig. 5

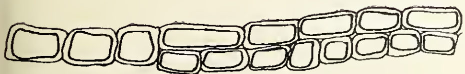

Fig. 4

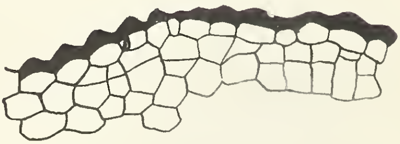

Fig. 7

VOLUME II JULY, 1917 No. 3

THE SECTION *TUBEROSAE* OF THE GENUS *CRASSULA* LINN. (WITH DESCRIPTIONS OF TWO NEW SPECIES)

BY S. SCHÖNLAND.

UNDER the section *Tuberosae* I unite the sections *Crenato-lobatae* and *Tuberosae* as defined by Harvey in the Flora Capensis, vol. II, p. 335. It includes, therefore, the genus *Septas* Linn. in Pl. Afr. Rar. 10 (1760) and Amoen. Acad. VI, 87 (1764), retained by Haworth in Syn. Pl. Succ. p. 61 (1812), by De Candolle in Monographie des Crassulacées, p. 26 (1828) and "Prodromus," III, p. 383 (1828), and by Ecklon and Zeyher in "Enumeratio," p. 292 (1837).

It was, however, already merged into the genus *Crassula* in Thunberg's "Flora Capensis," ed. Schultes (1823). The section also includes the genus *Petrogeton* E. & Z. in "Enumeratio," p. 291 (1837).

It may be defined as follows:

Herbae perennes carnosulae rhizomate tuberoso vel rarius elongato carnoso, foliis oppositis paucis petiolatis vel sessilibus vel perfoliatis disciformibus laminis subplanis suborbiculatis vel ovatis cordatis vel reniformibus, margine plerumque crenatis, rarius usque ad basin fere dissectis, inflorescentiis saepius terminalibus subumbellatis vel thyrsoideis, petalis sine mucrone subapiculato, filamentis subulatis, antheris saepius late oblongis, ovariis oblique ovatis, stilis filiformibus, squamis minutis obcuneatis.

The section is most largely represented in S.W. Cape Colony, extending into Namaqualand and the Karroo. One species, *Cr. Saxifraga* Harv., extends eastwards to the neighbourhood of Port Elizabeth and Somerset East, and is said also to occur in the Albany district. *Cr. nemorosa* Endl. is essentially an inhabitant of the Eastern districts of Cape Colony, while one species, *Cr. umbraticola* N. E. Br., is restricted to the Drakensberg range. All species favour damp, shady localities, such as damp rocks. On the whole the section is a fairly natural one, but relations to other sections can be traced in the following species: *Cr. Aitoni* Britt. and Bak. f. in Journ. of Bot. XXXV (1897), 480; *Cr. parvipetala* Schönl. in Rec. Alb. Mus. II (1913), 450, and *Cr. Marlothii* Schönl. in Journ. Linn. Soc. (Bot.), XXXI (1897), p. 553 (which may be identical with *Cr. minima* Thunb. in Fl. Cap. ed. Schultes, p. 292).

The so-called "tuberous roots" of descriptive works found in this section are, as far as I have investigated them, stem-structures. They are not only found in Harvey's section *Tuberosae* but also in his section *Crenato-lobatae* where, e.g. in *Cr. nemorosa* Endl., they are a means of extensive vegetative reproduction. In *Cr. dentata* Thunb. even the aerial stems form at their nodes tubers, which, no doubt, serve the same purpose. Similar tubers are found in the floral region of *Cr. nemorosa* Endl. In most species the connective is broadened. This does not occur in any other section of the genus except in *Cr. parvipetala* Schönl. which belongs to the section *Tillaea*.

Some of the species are extremely variable especially in the size of their vegetative organs.

Key to the species:

I. Leaves deeply divided. 13. *Cr. alcicornis* Schönl.

II. Leaves entire or nearly entire.
    A. Leaves distinctly petiolated.
        a. Cymes lateral and terminal.
            α. Petiole broadened (not filiform), lamina entire or faintly repand.
                1. Calyx lobes ovate, sub-acute, 2/3 of corolla in length.
                    3. *Cr. nemorosa* Endl.
                2. Calyx lobes ovate, obtuse, 1/3 of corolla in length.
                    4. *Cr. confusa* Schönl. et Bak. f.
            β. Petiole filiform, lamina more or less repando-crenate or lobulate.
                1. *Cr. dentata* Thunb.
        b. Cymes terminal.
            α. Sepals and petals obtuse.
                2. *Cr. Dielsii* Schönl.
            β. Sepals and petals acute.
                1. Sepals about half the length of the petals. Styles about the length of the ovaries. Margin of leaves crenate.
                    5. *Cr. Promontorii* Schönl. et Bak. f.

2. Sepals about the length of the petals. Styles about the length of the ovaries. Margin of leaves crenato-dentate.
   7. *Cr. umbraticola* N. E. Br.

B. Leaves sessile (or perfoliate disciform) or at the base cuneately narrowed. Inflorescences terminal.

a. Leaves 2, sessile (sometimes perfoliate disciform).
  α. Cymes paniculate.
    + Leaves 1·4—1·8 cm. long.
      10. *Cr. Weissii* N. E. Br.
    ++ Leaves 2—7 cm. long.
      9. *Cr. Umbella* Jacq.
  β. Cymes subumbellate.
      8. *Cr. Saxifraga* Harv.

b. Leaves 2—4, cuneate at the base.
  α. Petals subpanduriform acute; erecto-patent.
      6. *Cr. loriformis* Schönl. et Bak. f.
  β. Petals oblong-lanceolate.
      8. *Cr. Saxifraga* Harv.[1]

c. Leaves often 4—6, cuneate at the base.
  α. Peduncle short.
    + Pedicels short.
      √ Leaves up to 3·5 cm. broad, margin crenate-dentate.
        6. *Cr. loriformis* Schönl. et Bak. f.
      √√ Leaves up to 1·3 cm. broad with entire or sub-entire margin.
        4. *Cr. confusa* Schönl. et Bak. f.
    ++ Pedicels filiform up to 2·5 cm. long.
        5. *Cr. Promontorii* Schönl. et Bak. f.
  β. Peduncles long, filiform, sometimes one-flowered.
        11. *Cr. Septas* Thunb.

d. Leaves subsessile, about 8, very small (blade about 5 mm. long). 12. *Cr. Albertiniae* Schönl.

1. *Cr. dentata*, Thunb. in Flora Cap., ed. Schultes (1823), p. 293; *Cr. dentata* Thunb. var. minor Harv. in Flora Cap. II, p. 236; *Petrogeton typicum* E. & Z. in Enum. no. 1854, p. 291; *Cr. patens* Harv. in Fl. Cap. II, p. 356; *Petrogeton patens* E. & Z. Enum. no. 1855, p. 291.

Widely spread in S.-W. Cape Colony at an altitude of 300—1200 m. (but absent from the Cape Peninsula?).

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[1] In cultivated specimens the number of leaves may exceed four.

[1]Bain's Kloof, Schlechter, 9166; Tulbagh Waterfall, Bolus, 1151; Winterhoek Mt., Marloth, 2331; Mitchell's Pass, 3497 and Bolus 2610; Wupperthal, Leipoldt, 530; Cedarberge, Clanwilliam, E. & Z. 1854; near the Tulbagh Waterfall, E. & Z. 1855.

In *Cr. patens* Harv. (E. & Z. 1855) the leaves are more deeply cut than is usually the case in *Cr. dentata*, but I do not consider this species sufficiently distinct as the nature of the margin varies sometimes on the leaves of the same specimen.

2. *Cr. Dielsii*, Schönl. in Rec. Alb. Mus. I (1904), p. 117.
   Cedarberge, Clanwilliam, 1170 m., Diels, 1161.

3. *Cr. nemorosa*, Endl. in Walp. Rep. II, p. 253; Harv. in Flora Cap. II, p. 356; *Petrogeton nemorosum* E. & Z. in Enum. no. 1859, p. 292; *Cr. nivalis* (E. & Z.) Harv. in Flora Cap. II, p. 356; *Petrogeton nivale* E. & Z. Enum. no. 1860, p. 292. It has been suggested that this may be *Cr. cordata* Linn. in Syst. Veg. XIV, p. 306, suppl. p. 189; Thunberg in Nova Acta Nat. Cur. VI, p. 330; and Fl. Cap. ed. Schultes, p. 393, DC. Prodr. III, p. 389, which was re-named *Cr. neglecta* by Schultes in Syst. Veg. VI, p. 722, but the detailed description by Thunberg of specimens from the Zwartkops River does not fit in with *Cr. nemorosa* nor with any other *Crassula* I am acquainted with. *Cr. nemorosa* is found in damp shady places in the Eastern districts of Cape Colony from near sea-level to an altitude of at least 1500 m. It flowers mostly from July to October, sometimes right through the year.

   Maraisburg, Sim, 2689; Graaff Reinet, Bolus in Herb. Norm. Austr. Afr. 1043; Cookhouse, Rev. F. A. Rogers; Redhouse, Mrs T. V. Paterson; Bothashill near Grahamstown, MacOwan, 944; Port Alfred near sea-level, S. Schönland; Oxton near Wittlesea, E. E. Galpin, 7369. I have also seen an original specimen of Ecklon and Zeyher's *Cr. nivalis* from the Winterberg (no. 1860). It was unfortunately rather incomplete, but it did not seem to differ from *Cr. nemorosa* in any essential character.

4. *Cr. confusa*, Schönl. et Bak. f. in Journ. of Bot. XXXVI (1898), p. 366.
   Koudeberg, Schlechter, 8727.

5. *Cr. Promontorii*, Schönl. et Bak. f. in Journ. of Bot. XXXVI (1898), p. 366; *Cr. dentata* Harv. (excl. var. minor) in Flora Cap. II, p. 356; ? *Petrogeton dentatum* E. & Z. in Enum. no. 1857, p. 291.
   Kasteelspoort, Table Mt., Wolley-Dod, 1624; Bolus and Wolley-

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[1] The specimens quoted have been seen by me unless stated otherwise.

Dod also record it (in Trans. Phil. Soc. XIV, p. 262) from railside beyond Kalk Bay, Slangkop and Lion's Head and state further that it is rather rare, found in damp ledges under rock, and flowers from October to December.

6. *Cr. loriformis*, Schönl. et Bak. f. in Journ. of Bot. XL (1902), p. 289.

Kloof over Hexriver station, Wolley-Dod (Aug. 1897).

7. *Cr. umbraticola*, N. E. Br. in Kew Bull. (1895), p. 145; Wood in Natal Plants, vol. I, pl. 7.

Wood states that it is always found in very damp places, ledges of rock, etc., in deep shade. It ranges from an altitude of 1600 m. to about 2300 m. from the Maclear district to Van Reenen. It flowers, as far as recorded, from January to June.

Ugie distr. Maclear, Bolus, 8904; Drakensberg, in caves, M. S. Evans, 362; Wellington, Rosetta, T. R. Sim; Van Reenen, Schlechter, 6925.

8. *Cr. Saxifraga*, Harv. in Flora Cap. II, p. 357; Bot. Mag. t. 6068; *Septas globifera* E. & Z. in Enum. no. 1862, p. 292; *Septas globiflora*, Bot. Mag. t. 1472 (quoted by Harvey under *Cr. Septas* Thunb.); *Septas capensis* L., *S. globifera* DC. in Prodr. III, 383.

Widely spread in S.W. Cape Colony extending to the neighbourhood of Somerset East and Port Elizabeth from near sea-level to an altitude of 1800 m. Very variable in the size of its vegetative organs and in size and relative length of the floral organs.

Near Cape Town, Marloth, May, 1894; Matroosberg, Marloth, April, 1894; S.W. Cape Colony, Drege, 918; Caledon, Schlechter, 7604; Hangklip, Mund et Maire (July, 1821); Pakhuis, Clanwilliam, MacOwan in Herb. Austr. Afr. 1850; Hantam Mts, Dr Meyer (1869); Roggeveldt, alt. 1800 m., Marloth, 1713; near Port Elizabeth, Messrs Rabjohn and J. D. Drege and Mrs T. V. Paterson, 644; Bruintjeshoogde, MacOwan, 1910.

[illegible]

9. *Cr. Umbella*, Jacq. in Ic. Rar. t. 352; Tratt, Tab. pl. 253; Harvey in Fl. Cap. II, p. 357; *Septas Umbella* Haw. syn. p. 62; DC. Prodr. III, p. 383; *Petrogeton Umbella* E. & Z. Enum. no. 1856; *Cr. flabellifolia* Harv. in Fl. Cap. II, p. 357.

Harvey in Fl. Cap. says that *Cr. Umbella* resembles *Cr. flabellifolia* in floral characters. I cannot see any difference between them in this respect. The leaves are very variable and there are transitions between the almost separate ones of *Cr. flabellifolia* Harv. and those of *Cr. Umbella* Jacq. which are united to form a disc. Their margin is sometimes quite entire or more or less crenate. The partial inflorescences are frequently very loose, sometimes however capitate. The variations in these respects are not sufficient to distinguish even well characterised varieties, however much extreme forms differ from one another.

It is restricted to Namaqualand and the Clanwilliam district. O'okiep, Magennis, Drege and Bolus, 9512; Eenkoberboom, Schlechter, 11066; Brakdam, Schlechter, 11119; Clanwilliam, Leipoldt in Herb. MacOwan, 3038, and Herb. Austr. Afr. 8458; Pakhuis, MacOwan, 3302; Clanwilliam, Mader in Herb. MacOwan; Olifant's valley near Clanwilliam, Diels, 359; Clanwilliam, E. & Z. 1856.

10. *Cr. Weissii*, N. E. Br. in Kew Bull. (1908), p. 434.

I have not seen the original which was found by Weiss at Matjesfontein. Several specimens collected by Marloth in 1902 near Laingsburg seem to belong to this species.

11. *Cr. Septas*, Thunb. in Fl. Cap., ed. Schultes (1823), p. 291; Harvey in Fl. Cap. II, p. 358; *Cr. globiflora* Spreng. in Syst. I, 971, ex Ind. Kew.; *Septas capensis* Linn. in Sp. p. 489; Amoen. VI, 53, Syst. Veg. XIV, p. 353; E. & Z. in Enum. no. 1861, p. 292; Lam. Illustr. t. 276, ex Harvey.

Frequent on hill slopes in S.W. Cape Colony, especially in the Cape Peninsula.

The synonymy of this species is not quite clear to me yet. There is very little doubt that the older authors mixed up two species which were rightly separated by Harvey as *Cr. Saxifraga* Harv. and *Cr. Septas* Thunb. These to my mind can easily be distinguished by their petals which in the former are erect at the base and then curve outwards, while in the latter they are not recurved, but both vary very considerably in the shape and size of their vegetative organs and floral parts, and it may be found by those who are in a position to examine series of live specimens of what we now consider *Cr. Septas*, that it must again be split into two species. It may be added that the specimens of *Cr. Septas* which I have seen had an elongated rhizome and no tubers.

Mowbray Falls, Wilms, 3208, Rogers, 2447; round Cape Town and Hottentots' Holland, E. & Z. 1861; Roundhouse, Campsbay, Scott Elliott, 1041; near Capetown, Sieber, 127; Cape Peninsula, Bergius, Nov. 1816; Muizenburg, MacOwan in Herb. Austr. Afr. 210; Frenchhoek, Schlechter, 9289; Caledon, Schlechter, 7603; Malmesbury division near Hopefield and Darling, Bachmann, 96, 576, 971, 972.

12. *Cr. Albertiniae* Schönl. n. sp.

Herbacea carnosula pusilla; rhizomate carnoso parce ramoso; foliis circ. 8 radicalibus rosularibus horizontaliter patentibus ad solum adpressis planis subcarnosis breviter petiolatis minutissime rugulosis margine crenatis; pedunculo filiformi terminali paucifloro; floribus circ. 8 ebracteatis longe pedicellatis pedicellis filiformibus; sepalis basi connatis oblongo-lanceolatis apice inaequaliter bidentatis brunneis; petalis navicularibus oblongis basi attenuatis suberectis albis basin versus roseo-suffultis obtusis; staminibus quam petala brevioribus basi petalis adnatis filamentis subulatis antheris oblongis connectivo angusto; carpidiis staminibus subaequilongis gracilibus, stilis elongatis; squamis?

Rhizoma circ. 2·2 cm. longum, 2—3 mm. latum; lamina foliorum infimorum circ. 5 mm. longa, superiorum gradatim breviora, petiolus circ. 2 mm. longus; pedunculus 5—7 cm. longus; pedicelli 6—1·4 cm. longi; sepala 2 mm. longa; petala 4 mm. longa; stamina circ. 3·5 mm. longa.

Onverwacht near Albertinia, Dr J. Muir, 1315, May, 1914.

This species is allied to *Cr. Septas* Thunb. I was inclined at first to look upon it as a dwarf form of this species, but I think now it is perfectly distinct. Apart from its small size it differs in having radical leaves and in numerous details of floral structure.

13. *Cr. alcicornis*, Schönl. n. sp.

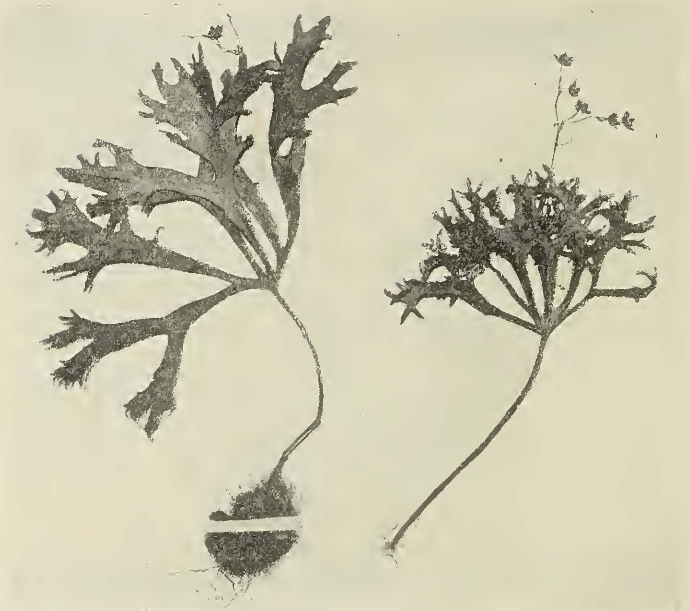
Herba glaberrima carnosula; rhizomate tuberoso radicibus fibrosis dense tecto; caule adscendenti gracili 1—2 nodo efoliato; summa foliis 2 oppositis sessilibus ambitu flabelliformibus usque ad basin fere dissectis lobis subdichotome ramosis apicem versus dentatis cornu alcis similibus, pedunculo tenuissimo filiformi terminali foliis subaequali vel paullo superanti; cyma terminali pauciflora bracteis parvis linearibus pedicellis filiformibus; sepalis ovato-lanceolatis basi in tubum brevem connatis, petalis subliberis oblongo-ovatis acutis patentibus; staminibus subliberis filamentis subulatis antheris late ovatis; carpidiis gracilibus stilis filiformibus; squamis minutis.

Rhizoma tuberosum 2 cm. longum, 1·3 cm. diam.; caulis circ. 5 cm. longus; folia 3·5—5 cm. longa, 5—6 cm. lata; pedunculus circ. 4·5 cm. longus; bracteae 1—1·5 mm. longae; pedicelli 2—6 mm. longi; sepalorum lobi 1·5 mm. longi, tubus circ. ·5 mm. altus; petala 3 mm. longa; stamina circ. 2 mm. longa; carpidia circ. 2·7 mm. longa.

Kardouw Pass, Clanwilliam div., Olifant's R. Mts, July, 1915, Mrs L. Bolus (Bolus Herb. No. 14815).

I owe this striking plant to the kindness of Mrs Bolus. Nobody, without seeing the flower, would at first sight recognise it as belonging

to the *Crassulaceae*, amongst which the nature of its leaves makes it quite unique. The dried specimens, as seen from the accompanying photograph, look more like sea weeds than phanerogamic plants.



Phot. by Mr J. Hewitt, M.A.

Crassula alcicornis Schönl. About $\frac{5}{6}$ natural size.

NOVITATES AFRICANAE

Oxalis Edwardsiae, Bol. f. (*Geraniaceae*). *O. breviscapae*, Jacq. et *O. pulchellae*, Jacq. affinis, sed a priore staminibus interioribus edentatis, a posteriore foliolis pagina inferiore omnino glabris, etiam ab utroque foliolis minoribus diverseque formatis, haud venosis, infra pallidioribus, conspicuis reliquis (in siccis) cellularum collapsarum pellucidarum subclavatarum epidermatarum et corollae colore differt.

Herba ad 3·5 cm. alta; bulbi fusiformes, longitudinaliter sulcati, nonnunquam transverse rugosi, atro-brunnei, 1·3—1·7 cm. longi; caulis non exsertus; folia 3-foliolata, petiolis pilosis, ad 1·7 cm. longis, foliolis mediis subreniformibus, cuneatis, lateralibus subreniformibus vel subrotundis, glabris, vel rare distanter ciliatis, marginibus dense rubro-callosis, in siccis supra punctatis, infra squamulosis per cellulas collapsas, subclavatas, pellucidas, epidermas, pallidioribus, ad 0·4 cm. longis, 0·6 cm. latis; pedunculi 1-fl., pilosi, pilis saepissime supra medium densioribus, 0·4—0·8 cm. longi, bibracteolati parum supra basin, bracteolis linearibus, acutis, glabris, membranaceis, marginibus apice per 0·15 cm. vel minus rubro-callosis, ad 0·4 cm. longis; calyx 0·3 cm. longus, segmentis oblongo-ovatis, acutis vel subacutis, glabris vel pilosis praecipue supra medium, minute ciliolatis, supra medium pilis longis interjectis, marginibus per tertiam superiorem rubro-callosis; corolla infundibuliformis, ad 2·4 cm. longa, petalorum lamina apice subtruncata, parcissime ciliolata, marginibus externe sparse rubro-callosis, valde pallide salmonea; filamenta interiora edentata; ovarium ad apicem pilosum, 0·15 cm. longum, stylis basin versus pilosis, ad apicem minute puberulis.

Cape Province: South-Western Region; Piquetberg Div., Monte Cristo near Porterville, fl. May, 1912, *G. Edwards*, No. 73. Malmesbury Div., Kalabas Kraal, alt. circa 230 ft, fl. May, 1915, *F. Bolus* (Bolus Herb. No. 14555).

Allied to *O. breviscapa*, Jacq. and *O. pulchella*, Jacq., but differs from the former in the toothless inner stamens, from the latter in the lower surface of the leaflets being entirely glabrous, and from both in the leaflets being smaller, differently shaped, not veined, paler below, in having in the dried state the conspicuous remains of collapsed, pellucid, subclavate epidermal cells, and in the colour of the corolla.

Anthospermum littoreum, L. Bolus (*Rubiaceae—Anthospermeae*), *A. hispidulo* affine sed foliis obovato-spathulatis glabris, fructu pilis pellucidis vestito, calycis dentibus deficientibus differt.

Herbaceum vel fruticulosum, ramis elongatis decumbentibus pubescentibus, pilis crispulatis brevibus, 30 cm. longis vel ultra, 0·3 cm. diam., internodiis 0·5—3 cm. longis; folia patentia vel saepius reflexa, spathulata vel obovato-spathulata, obtusa, marginibus revolutis, nervo medio solo apparente, praecipue subtus, 0·8—1·6 cm. longa, 0·3—0·5 cm. lata, stipulis simplicibus ± 0·2 cm. longis; flores dioecii 4-meri; bracteolae minutae lineares-acuminatae, demum, in fructu, accrescentes induresccentesque, ad 0·2 cm. longae; calycis (fl. ♂) tubus 0·1 cm. longus, segmentis minutissimis vel obsoletis; corollae tubus 0·1 cm. longus, segmentis oblongis acutis, 0·2 cm. longis; stamina corollam aequantia vel parum excedentia, antheris 0·18 cm. longis; flores ♀ 0·2 cm. longi, stylis 0·5 cm. longis; fructus subimmaturus oblongus, pilis patentibus albis pellucidis vestitus, 0·2—0·3 cm. longus.

Cape Province: South-Eastern Region; East London, coast, almost in water, fl. March, *T. R. Sim*, 1483, fl. April, *G. Rattray*, 38. Kentani Div., near Black Rock Cove, fl. March, common, *Alice Pegler*, 2139. Pondoland, Port St John's, on seashore, alt. 20 ft., fl. April, *E. E. Galpin*, 2850.

Allied to *A. hispidulum*, E. Mey., but differs in having obovate-spathulate glabrous leaves, and fruit clothed with pellucid hairs and destitute of calyx-teeth.

Scabiosa Tysonii, L. Bolus (*Dipsaceae*), ramis uniformiter foliatis, foliis radicalibus nullis, calycis setis vix evolutis vel ad 0·1 cm. longis.

Herbacea erecta ramosa, ad 80 cm. alta; rami elongati, superne pedunculoidei, teretes pubescentes, pilis saepius reflexis, crispulatis brevibus, internodiis 3—6 cm. longis; folia radicalia nulla, caulina adscendentia, breviter connata, interdum in petiolum attenuata, pinnatipartita, lobis 2—3-jugatis, irregulariter lobata-dentatis, terminali multo majore, obovato vel oblongo, basi cuneato, 2·5—4·5 cm. longo, 1·5—3 cm. lato, lateralibus infimis dentiformibus vel ad 1·5 cm. longis, molliter pubescentia vel glabrescentia, ad 5·5 cm. longa; pedunculi solitarii, 6—17 cm. longi; capitula 1·5—2 cm. diam.; involucri folia 1- vel imperfecte 2-seriata, floribus aequilonga vel longiora, ad 1·5 cm. longa; receptaculum oblongum, bracteis rhomboideo-spathulatis, 0·3—0·4 cm. longis; flores albi vel lilacini, 0·9—1·4 cm. longi; involucellum 0·2 cm. longum; fructus non visus.

South-Eastern Region: Cape Province; Transkei, Kentani, grassy slopes, alt. 1000 ft., fl. summer, *Alice Pegler*, 715 ("not common here"). Griqualand East, Fort Donald, margins of woods, alt. 5000 ft, fl. Jan.,

W. Tyson, 1644. King Williamstown Div., Perie, in damp ground, alt. 3000 ft, fl. Jan., *T. R. Sim*, 2131. Stutterheim Div., summit of mountain above Dohne, alt. 4000 ft, fl. March, *H. G. Flanagan*, 2298. Stutterheim, fl. Dec., *F. A. Rogers*, 12710. Natal; Benvie, alt. 4—5000 ft, fl. May, *J. Wylie* (J. M. Wood, No. 7867).

Distinguished in having the branches uniformly leafy throughout, with no radical leaves, and the very short bristles of the calyx.

Leucadendron cordatum, Phillips sp. nov. *Ramuli* pubescentes. *Folia* 3·5—7 cm. longa, 2·2—4·2 cm. lata, ovata, apice rotunda leviter retusaque, basi cordata, glabra. *Inflorescentia* ♂ solitaria 2·2—2·5 cm. longa, 2—2·5 cm. lata, summis flavis foliis circumdata. *Bracteae involucri* 8—9-seriatae, reflexae, 1·4 cm. longae, 9 mm. latae, ovatae, apice obtusae, glabrae. *Bracteae floriferae* 1·3 cm. longae, 1—1·5 mm. latae, lineares, apice obtusae, glabrae. *Tubus perianthii* 1·2 cm. longus, cylindratus, glaber; lobi 6 mm. longi, lineares, glabri; limbus 4 mm. longus, lineari-lanceolatus, apice obtusus. *Antherae* 3·5 mm. longae, lineares. *Squamae hypogynae* 3 mm. longae, lineari-subulatae. *Stylus* 1·1 cm. longus, basi pilosi; stigma minute bifidum.

Cape Province: South-Western Region; Robertson Div., near summit of mountain behind Montagu Baths, fl. June (Bolus Herbarium, No. 13904). *Branches* minutely pubescent. *Leaves* 3·5—7 cm. long, 2·2—4·2 cm. broad, ovate, rounded and slightly retuse at the apex, distinctly cordate at the base, palmately many-nerved from the base when fresh, glabrous. *Male inflorescence* solitary at the end of young shoots about 10 cm. long which bear leaves similar to the stem leaves but bright yellow in colour with red margins and apices. *Male heads* 2·2—2·5 cm. long, 2—2·5 cm. in diameter, rectangular in outline, surrounded by a number of bright yellow involucral bracts. *Involucral bracts* 8—9-seriate, all but the innermost series reflexed, 1·4 cm. long, 9 mm. broad, ovate, obtuse, glabrous. *Floral-bracts* 1·3 cm. long, 1—1·5 mm. broad, linear, obtuse, glabrous, yellow near the apex, otherwise colourless. *Flowers* opening from the circumference inwards yellow, soon becoming brown with age. *Perianth-tube* 1·2 cm. long, cylindric, glabrous; lobes 6 mm. long, linear, glabrous; limb 4 mm. long, linear-lanceolate, obtuse and slightly recurved at the apex. *Anthers* 3·5 mm. long, linear. *Style* 1·1 cm. long, terete, gradually tapering above, pilose at the base, otherwise glabrous; stigma minutely bifid. *Hypogynous scales* 3 mm. long, linear-subulate, gradually tapering to the base.

A species differing from any known species in the genus by the distinctly cordate leaves, somewhat resembling those of *Protea latifolia*, R. Br. It is an extremely handsome and showy plant, the bright

yellow leaves surrounding the inflorescence are edged with crimson making the male heads very conspicuous. After the flowers have faded the yellow leaves turn green and function as foliage leaves.

Described from a living specimen presented by Miss I. Arbuthnot.

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Gladiolus Davisoniae, Bol. f. (§ *Eugladiolus*) [*Irideae-Ixieae*], foliis ensiformibus, minute sparseque pubescentibus, perianthio roseo colorato, segmentis tantum supra medium patentibus, et 3 inferioribus in genere angustis distinguitur.

Cormus subrotundus, 2 cm. longus et diam., tunicis tenue striatis; caulis erectus, teres, glaber, 13 cm. longus (sine spica), foliorum vestigiis basi ad 8 cm. longis praeditus; folia basalia 5, lineari-lanceolata, acuminata, erecta, substricta, plana, rigida, nervis minute pubescentibus, marginibus incrassatis, medio nervo subprominente, 25—32 cm. longa, 1—1·5 cm. lata; folia caulina 0—3; spica aequilateralis vel secunda, simplex, axi substricto vel flexuoso, tereti, glabro, 18—27 cm. longa, 7—11 fl., floribus suberectis; spathae valvae exteriores lineares vel lanceolatae, acuminatae, interioribus longiores, infimis 4·7—9·5 cm. longis, circa 1 cm. latis, illis prope medium 4·2—5·7 cm. longis, circa 1 cm. latis; perianthii tubus supra infundibuliformis, parum curvatus, 2·8—3 cm. longus; segmentis minute apiculatis, roseis, 3 inferioribus media saturiore rosea linea ad apicem attenuatis notatis, 3 superioribus elliptico-oblongis, subaequalibus, acutis vel subobtusis, 2·8—3·1 cm. longis, 1—1·4 cm. latis, 3 inferioribus lanceolato-spathulatis acutis, lateralibus 2·5—3·1 cm. longis, 0·6—0·75 cm. latis, medio parum longiore latioreque; stamina dimidium segmentorum attingentia, antheris linearibus, 0·9—1·1 cm. longis; stylus (evolutus) parum magis quam 2/3 segmentorum attingens.

Cape Province: Karroo Region; Somerset East Div., near Somerset East, on mountain, *F. A. de Courcy*. Flowered in National Botanic Gardens, March 1915, No. $\frac{498}{14}$ (Bolus Herb. No. 14762). Upper Region; Bedford Div., Dagga Boer, near Witmoss, *J. Davison*. Flowered in National Botanic Gardens, March, 1915, No. $\frac{946}{14}$ (Bolus Herb. No. 14763).

Distinguished by the ensiform leaves which are minutely and sparingly pubescent, by the pink perianth, by the segments which spread only above the middle, and by the narrowness (for the genus) of the 3 lower segments.

Described from living specimens which flowered in the National Botanic Gardens. Not closely allied to any species known to me. In general aspect it seems nearest to *G. Macowani*, Baker which I only know in the dried state, but the latter has been placed by Baker in the group *Cardinales* while *G. Davisoniae* is quite differently coloured from those in that group, and the perianth is considerably smaller. It will probably be best placed in the *Blandi* group.

Gladiolus Symonsii, Bol. f. (§ *Eugladiolus*), forma segmentorum, tubo subgenuflexo angustoque et antherarum longitudine distinguitur.

Cormus ignotus; caulis substrictus, teres, glaber, 23—32 cm. longus (sine spica); folia subbasalia 2, erecta, linearia, acuminata, substricta, plana, glabra, laminis 10—11 cm. longis vel ultra (parte superiore infimarum deficiente), 0·2 cm. latis; folium caulinum 1, 3·8—7·1 cm. longum; spica secunda, simplex, axi valde flexuoso, tereti, glabro, 1·5—5·2 cm. longa, 2—4 fl.; spathae valvae lineares vel oblongo-lineares, acutae, crebre nervosae, interiores bidentatae, dentibus setaceis, 1·6—1·8 cm. longae, 0·35 cm. latae, exteriores 1·7—2·8 cm. longae, 0·45 cm. latae; perianthii tubus superne infundibuliformis, parum curvatus, apicem versus subgenuflexus, 0·75—1·3 cm. longus, 0·1 cm. diam., segmentis acutis, roseis, summo oblongo-ovato, 2·25 cm. longo, 1·25 cm. lato, lateralibus superioribus oblongo-lanceolatis 2·2 cm. longis, 1·05 cm. latis, lateralibus inferioribus oblongo-lanceolatis, 1·95 cm. longis, 1 cm. latis, medio lanceolato 2·1 cm. longo, 0·7 cm. lato; stamina et stylus (evolutus) circa dimidium segmentorum attingentia, antheris linearibus, 0·95 cm. longis.

Natal: Kalahari Region—Eastern Mountain Province; Bushman's Peak, alt. 9500 ft, fl. Jan. 1915, *R. E. Symons*, 336.

Distinguished by the shape of the perianth segments, the somewhat genuflexed and narrow tube and by the length of the anthers.

Described from two dried specimens. Not closely allied to any species known to me. In general aspect it recalls *G. biflorus*, Klatt., while the perianth resembles that of *G. parvulus*, Schltr., from which species, however, it is in other respects quite distinct. It is interesting as being one of the very few narrow-leaved species in the § *Eugladiolus* recorded from the South-Eastern, the Kalahari or the Eastern Mountain Province Region.

Gladiolus eulophioides, Bol. f. (§ *Eugladiolus*), *G. Guthriei*, Bol. f., affinis sed omnino glaber, spathae valvis circuitu diverse conformatis, floribus nutantibus et segmento summo subacuto differt.

Cormus vagina basalique ignoti; caulis erectus, substrictus, teres, glaber, 52 cm. longus (sine spica); folia basalia 2, laminis erectis, linearibus, acutis, planis, rigidis, nervis subprominentibus, glabris, inferiore 7 cm. longa, 0·55 cm. lata, superiore 3·2 cm. longa, 0·4 cm. lata; folium caulinum unum, lamina 3·3 cm. longa; spica laxa, aequilateralis, simplex, axi substricto, tereti, glabro, 17·3 cm. longa, 6 fl., floribus nutantibus; spathae valvae oblongae, subacutae, exteriores (circa in media spica) 2·5 cm. longae, 0·7 cm. latae, interiores parum breviores angustioresque; perianthii tubus superne infundibuliformis, apicem versus genuflexus, gracilis, 2—2·7 cm. longus, 0·15 cm. diam. (circa medio), segmentis obovato-spathulatis, subacutis, summo 1·6—2 cm. longo, circa 0·9 cm. lato, lateralibus circa 1·45 cm. longis, circa 0·65 cm. latis, 3 inferioribus aequalibus, circa 1·35 cm. longis, 0·5 cm. latis, basi ad 0·35 cm. coalitis; stamina stylusque circa 3/4 segmenti summi attingentia, antheris linearibus, 0·85 cm. longis.

Cape Province: South-Western Region; Caledon Div., Caledon, fl. Oct. 1852, *Pappe*, 461.

Allied to *G. Guthriei*, Bol. f., but differs in being entirely glabrous, in the differently shaped spathe valves, the nodding flowers, and in the subacute uppermost segment.

Described from a single dried specimen.

Gladiolus acuminatus, Bol. f. (§ *Eugladiolus*), *G. leptosiphoni* Bol. f., affinis sed perianthii colore et tubo longiore, segmentis inferioribus diverse formatis, subaequalibus valdeque acuminatis bene distinguitur.

Cormus ignotus, caulis erectus, subflexuosus, teres, glaber, simplex vel rarius 1-ramosus circa medium, 18—29 cm. longus (sine spica); folia basalia 1—2, erecta, stricta, plana, linearia, acuta vel acuminata, saepe apice rubida, glabra, laminis 7—26 cm. longis, 0·1—0·15 cm. latis; folia caulina 1—2, laminis ad 8 cm. longis; ramus floriferus 1, erecto-patens, subflexuosus, teres, glaber, 2 fl., 6—7 cm. longus; spica terminalis secunda, axi substricto vel flexuoso, tereti, glabro, 2·5—16 cm. longa, 1—8 fl., floribus suberectis; spathae valvae oblongae vel oblongo-lanceolatae, tenue nervosae, saepissime apice rubidae, exteriores (circa in media spica) acutae, 1·7—2·3 cm. longae, circa 0·5 cm. latae, interiores obtusae, bidentatae, parum breviores angustioresque exterioribus; perianthii tubus erectus, strictus, nisi circa medium subgenuflexus, 2—2·9 cm. longus, circa 0·2 cm. diam. infra flexum, 0·4—0·6 cm. diam. supra flexum, segmentis pallide viridiflavidis, nonnunquam linea media viridi percursis, ovato-lanceolatis, valde acuminatis, subaequalibus (summo parum longiore latioreque), 1·3—2·3 cm. longis, 0·6—1·4 cm. latis; stamina circa dimidium segmentorum attingentia, stylus 1/2—3/4 (vel ultra) segmentorum attingens; antheris linearibus, 0·6—0·8 cm. longis.

Cape Province: South-Western Region; exhibited at the Caledon Wild Flower Show, Sept. 1915, 1916. Said to come from the neighbourhood of Caledon. (Bolus Herb. No. 14793.)

Allied to *G. leptosiphon*, Bol. f., but well distinguished by the colour and the longer tube of the perianth, and by the differently shaped, subequal, very acuminate lower segments.

It has a fragrant scent.

Gladiolus Guthriei, Bol. f. (§ *Eugladiolus*), folio uno breviter producto, vaginis pilosis et summo segmento perianthii fere duplo latiore quam laterales bene distinguitur.

Cormus non visus; caulis erectus, teres, glaber, 41 cm. longus (sine spica); folium basale unum, lamina erecta, ensiformi, acuta, rigida, plana, glabra, marginibus incrassatis, nervis subprominentibus, 6·3 cm. longa, 0·85 cm. lata; folia caulina 3, parte libera brevissima, vaginis omnium foliorum inter nervos pilis longis, albis, patentibus parce vestitis; spica aequilateralis, simplex, axi substricto, subtereti, glabro, 8 cm. longo, 4 fl.; spathae valvae oblongae, abrupte acutae, crebre nervosae, 1·5—2 cm. longae, 0·65 cm. latae, interioribus parum angustioribus et vix brevioribus; perianthii tubus substrictus, superne infundibuliformis, 2 cm. longus, segmentis ellipticis, valde obtusis, purpureis, summo late elliptico apice rotundato, 1·9 cm. longo, 1·3—1·35 cm. lato, 2 lateralibus 1·45 cm. longis, 0·9 cm. latis, inferioribus unguiculatis, 1·6 cm. longis, 0·75 cm. latis, medio parum angustiore; stamina stylusque circa dimidium segmenti summi attingentia, antheris linearibus, 0·6 cm. longis; styli ramis 0·2 cm. longis.

Cape Province: South-Western Region; Bredasdorp Div., Elim, alt. circa 500 ft, fl. July, 1895, *F. Guthrie*, 3821.

Well marked by the one shortly produced leaf, the pilose sheaths, and in the uppermost perianth segment being nearly twice as broad as the lateral.

Described from a single dried specimen.

Gladiolus Bolusii, Baker, var. Burchellii, Bol. f., foliis evolutis 2—3, spicis ad 16 fl., periantheo caeruleo, ceteris typicis.

Cormus globosus, tunicis fibrosis; caulis erectus, substrictus, teres, glaber, 30—63 cm. longus (sine spica), ad 0·5 cm. diam.; folia basalia 2—3, suberecta, subflexuosa, anguste linearia, acuta vel setaceo-acuminata, plana vel involuta, gracillima, nonnunquam rigida, saepissime satis subito vaginae ore angustata, glabra, 25—70 cm. longa, 0·1—0·3 cm. lata, vaginis nonnunquam prominenter striatis; folia caulina 1—2, summo ad 16·5 cm. longo; spica aequilateralis vel secunda, simplex, axi stricto vel flexuoso, subtereti, glabro, ad 24 cm. longa, 1—16 fl.; spathae valvae oblongae vel lineari-oblongae, saepe naviculares, obtusae vel rare subacutae, multi-nervosae, exteriores (circa in media spica) 1·5—3·5 cm. longae, 0·5—0·9 cm. latae, interiores breviores; perianthii tubus superne infundibuliformis, curvatus, saepe apicem versus genuflexus, 0·9—1·5 cm. longus, segmentis caeruleis, 3 inferioribus linea media flava e basi percursis circa dimidium segmentorum attingente (2 lateralibus saepe macula, transversa, lata, flava circa medium, medio basin versus macula flava donato), basin versus purpureo-striatis, summo obovato vel fere subrotundo, valde obtuso, 2—2·7 cm. longo, 1·4—2·5 cm. lato, lateralibus rotundo-obovatis vel late ellipticis, valde obtusis vel subacutis, 1·7—2·1 cm. longis, 1·3—1·9 cm. latis, 2 lateralibus inferioribus oblongo- vel obovato-spathulatis, 1·7—2·4 cm. longis, 0·75—1 cm. latis, medio rotundo-obovato vel late elliptico, obtuso vel subacuto, 1·4—1·9 cm. longo, 1—1·2 cm. lato; stamina stylusque 1/2 vel 3/4 segmenti summi attingentia, antheris linearibus, 0·65—1·05 cm. longis.—*G. involutus*, Baker, in Fl. Cap. vi, 147, *non de la Roche.*

Cape Province: South-Western Region; Riversdale Div., near Albertinia, fl. Sept. 1913, *J. Muir*, 872; Riversdale, — *Versfeld.* Flowered in National Botanic Gardens, Sept. 1915, No. $\frac{3869}{14}$ (Bolus Herb. No. 14807). Kuysna Div., Groene Vallei, western end, fl. Aug. 1814, *Burchell*, 5631, 5683. Humansdorp Div., Assegai Bosch, alt. 900—1000 ft, fl. Aug. 1912, *F. A. Rogers*, 2879. Mossel Bay Div., Robinson Pass, fl. Oct. 1905, *Beatrice Hops* (in Herb. Bolus, 10056); same locality, alt. circa 2500 ft, fl. Dec. 1905, *H. Bolus*, 14950. Karroo Region: Prince Albert Div., summit of Zwartberg Pass, alt. circa 5400 ft, fl. Dec. 1905, *H. Bolus*, 12353.

With 2—3 produced leaves, with the spike up to 16 flowered and with the perianth blue, in other respects like the type.

This variety of *G. Bolusii* has been confused with *G. involutus*, de la Roche, a very different plant. *G. Muirii*, L. Bolus, has been indentified quite definitely with Miller's figure of *G. involutus*, and must therefore be regarded as synonymous with that species.

Gladiolus inclusus, Bol. f. (§ *Eugladiolus*), *G. crassifolio*, Baker, affinis sed foliis paucioribus brevioribusque, spathae valvis multo longioribus latioribusque et floribus multo paucioribus differt.

Cormus ignotus; caulis suberectus, teres, glaber, 30 cm. longus (sine spica); folia basalia 3, erecta, stricta, linearia, acuta, plana, glabra, crebre nervosa, medio nervo prominente, 10—19 cm. longa, 0·5—0·6 cm. lata; folia caulina 3, infimo infra caulis medium oriente; spica secunda, simplex, axi stricto, tereti, glabro, 12 cm. longo, 7 fl.; spathae valvae submembranaceae, subventricosae, crebre nervosae, exteriores oblongae, acuminatae, circa 3·6 cm. longae, 1 cm. latae, interiores lineari-oblongae, acutae, circa 2·4 cm. longae, 0·65 cm. latae; perianthii tubus infundibuliformis, curvatus, 1 cm. longus, segmentis oblongo-spathulatis, obtusis, 3 superioribus 1·45 cm. longis, 0·55 cm. latis, lateralibus inferioribus 1·2 cm. longis, 0·4 cm. latis, medio parum longiore; stamina circa tertium segmentorum attingentia, antheris linearibus, 0·65 cm. longis; stylus circa dimidium segmentorum attingens.

Transvaal: Kalahari Region—Eastern Mountain Province; Lydenburg Div., Pilgrim's Rest, fl. Dec. 1914, *F. A. Rogers*, 14311.

Allied to *G. crassifolius*, Baker, but differs in the fewer and shorter leaves, the much longer and broader spathe-valves and in being much fewer flowered.

Described from a single dried specimen.

Gladiolus vaginatus, Bol. f. (§ *Eugladiolus*), *G. brevifolio*, Jacq., affinis sed saepissime elatiore habitu, vaginis valde longioribus, spathae valvis longioribus angustioribusque et perianthii colore differt.

Cormus subrotundus, 1·2 cm. longus, 1·3 cm. diam., tunicis papyraceo-membranaceis, fere integris, pallide brunneis; caulis erectus, strictus, teres, glaber, 72—110 cm. longus (sine spica); folia 3, basalia, laminis vix vel ad 1·6 cm. longis evolutis, 0·3 cm. latis, obtusis vel acutis, glabris, vaginis striatis, glabris, infimis 14—77 cm. longis, mediis 54—89 cm. longis, summis 64—97 cm. longis; spica aequilateralis vel secunda, axi substricto, vel flexuoso, tereti vel subcomplanato, glabro, 6·5—11 cm. longa, 5—9 fl.; spathae valvae (circa in media spica) lineari-lanceolatae vel lineari-oblongae, acutae vel acuminatae, exteriores 1·7—2·6 cm. longae, 0·25—0·35 cm. latae, interiores parum breviores latioresque; perianthii tubus superne infundibuliformis, parum curvatus, 0·55—0·75 cm. longus, segmentis obtusis, griseo-caeruleis, 3 inferioribus linea media purpurea percursis et basin versus satis minute purpureo-striatis, 3 superioribus ellipticis, subaequalibus, 1·7—2·3 cm. longis, 0·8—1·1 cm. latis, 2 lateralibus inferioribus elliptico-oblongis, 1·25—1·8 cm. longis, 0·5—0·65 cm. latis, medio elliptico, 1·4—1·9 cm. longo, 0·7—0·8 cm. lato; stamina stylusque dimidium vel ultra segmentorum attingentia, antheris linearibus, 1 cm. longis.

Cape Province: South-Western Region; Riversdale Div., Albertinia, fl. April, 1914, *J. Muir*, 1287.

Allied to *G. brevifolius* Jacq., but differs in the usually taller habit, the much longer sheaths, the longer and narrower spathae-valves, and in the colour of the perianth.

This well-marked species seems to be nearest *G. brevifolius*, Jacq., especially the form figured by Redouté under the name *G. Orobanche*. The fully developed leaves are most probably produced after the flowering period as in *G. brevifolius*. A specimen (*J. Muir*, 178) collected at Stille Bay in the Riversdale Division in April, 1909, appears to be a starved form of this species. It attains a height of about 40 cm., with a very slender stem, and is 1—2 flowered.

Gladiolus brachyphyllus, Bol. f. (§ *Eugladiolus*), *G. brevifolio*, Jacq., affinis sed robustiore elatioreque habitu, foliorum laminis longioribus latioribusque et perianthii notationibus differt.

Cormus non visus; caulis erectus, strictus vel subflexuosus, teres, glaber, 45—61 cm. longus (sine spica) ad 0·5 cm. diam.; folia subbasalia 3—4, laminis vix, vel superioribus ad 7·8 cm., productis, erecta, linearia, acuta, plana, glabra, ad 0·4 cm. lata; folia caulina 1—2, ad 11·5 cm. longa, 0·3 cm. lata; spica aequilateralis, simplex, axi stricto vel flexuoso, subtereti, glabro, 11—26 cm. longa, 6—10 fl.; spathae valvae oblongo-lanceolatae, acutae vel acuminatae, submembranaceae, crebre nervosae, apicem versus lilacinae, interiores acutae vel setaceo-acuminatae, saepe bidentatae, dentibus setaceis, aequantes vel parum excedentes exteriores, illis (circa in media spica) 1·6—2·1 cm. longis, 0·45—0·6 cm. latis; perianthii tubus curvatus, superne infundibuliformis, rubens (in siccis), 1·6—1·9 cm. longus, segmentis oblongis vel elliptico-oblongis, obtusis, vel subacutis, basin versus attenuatis, nonnunquam minute apiculatis, roseis, basi vero macula sature rubente notatis, 3 inferioribus linea media rubente percursis, superioribus lateralibus 2·3—2·8 cm. longis, 0·9—1·1 cm. latis, summo parum longiore, inferioribus lateralibus 2·1 cm. longis, 0·75 cm. latis, medio parum longiore latioreque; stamina circa dimidium segmentorum attingentia, antheris linearibus, 0·8 cm. longis; stylus (evolutus) circa dimidium segmentorum attingens.

Transvaal: South-Eastern Region; on the Selati Railway between Komati Poort and the Letaba River, alt. 1000—2000 ft, fl. June, 1912, *F. A. Rogers*, 11807.

Allied to *G. brevifolius* Jacq., but differs in the more robust and taller habit, in the longer and broader leaf-blades and in the markings of the perianth.

Described from several dried specimens. The fully developed leaves are probably produced after the flowering period.

Gladiolus varius, Bol. f. (§ *Eugladiolus*), spathae valvis longissimis, angustis setaceo-acuminatisque et perianthii tubo longissimo, gracillimo, fere stricto (typice quam limbus duplo longiore) bene distinguitur.

Cormus ignotus; caulis erectus, substrictus, teres, glaber, 2 foliis non productis basi vero donatis, 49 cm. longus (sine spica); folia basalia 5, suberecta, stricta, linearia, plana, glabra, crebre nervosa, medio nervo valde prominente, 38 cm. longa vel ultra (superiore parte fere omnium foliorum deficiente), 0·35—0·85 cm. lata; folia caulina 2, inferiore ad 23 cm. longo; spica aequilateralis vel subsecunda, simplex, axi subflexuoso, tereti vel ± lateraliter compresso, glabro, 15—22 cm. longa, 9—10 fl., floribus suberectis; spathae valvae lineares vel lineari-oblongae, acutae vel setaceo-acuminatae, submembranaceae crebre nervosae, nonnunquam brunneae, exteriores (circa in media spica) 5·5 cm. longae, 0·7 cm. latae, interiores nonnunquam bidentatae, dentibus setaceis, 3·7 cm. longae, 0·55 cm. latae; perianthii tubus superne infundibuliformis, gradatim ad faucem dilatatus, parum curvatus, gracillimus, ad 5·3 cm. longus, 0·1 cm. diam. circa medio, segmentis obtusis vel subacutis, minute apiculatis, roseis, summo ovato vel elliptico, 2·1 cm. longo, 0·9—1·2 cm. lato, lateralibus elliptico- vel ovato-oblongis, 1·75—2·4 cm. longis, 0·85 cm. latis, 3 inferioribus elliptico-oblongis vel oblongo-spathulatis, 1·3—1·65 cm. longis, 0·55 cm. latis, medio nonnunquam longiore; stamina et stylus (evolutus) dimidium vel fere apicem segmentorum attingentia, antheris linearibus, 0·75 cm. longis.

Var. β, brevifolius; cormo depresso-globoso, 2·4 cm. longo, 2·9 cm. diam., tunicis fibrosis, crebris; caule foliorum vestigiis basi ad 3 cm. longis praedito, 19 cm. longo; foliis 17·5—20 cm. longis, 0·4 cm. latis; perianthii tubo ad 4·5 cm. longo, ceteris typicis.

Var. γ, elatus; caule 65 cm. longo (sine spica); foliis basalibus 8, ad 82 cm. longis, ad 1·2 cm. latis; folio caulino infimo 59 cm. longo; rami floriferi 2, 12—16 cm. longi, 9—18 fl., infimo circa 65 cm. a basi oriente; spica terminalis aequilateralis 35 cm. longa, 39 fl.; spathae valvis exterioribus (circa in media spica) 2·5 cm. longis, interioribus oblongis, obtusis, minute bidentatis, 1·1 cm. longis, perianthii tubo ad 2·9 cm. longo, ceteris typicis.

Transvaal: Kalahari Region.—Eastern Mountain Province; Lydenburg Div., Pilgrim's Rest, fl. March, 1915, *F. A. Rogers*, 14601. Var. β: Barberton Div., summit of Saddleback Mountain, near Barberton, alt. 5000 ft, fl. Feb. 1890, *E. E. Galpin*, 828. Var. γ: lower slopes about Barberton, alt. 2800—3000 ft, fl. March, 1890, *E. E. Galpin*, 860.

Well marked by the very long, narrow and setaceously acuminate spathe-valves, and by the very long, very slender and almost straight perianth tube.

Perhaps the nearest ally of this well-marked species, especially the variety *brevifolius*, is, according to the description, *G. brachylimbus*, Baker. From this the typical form and to a lesser extent the aforesaid variety differ chiefly in the longer and more acuminate spathe-valves and in the longer perianth tube. The variety *elatus* in general aspect resembles *G. crassifolius*, Baker, but is considerably taller and has a differently shaped perianth.

Gladiolus callistus, Bol. f. (§ *Eugladiolus*), *G. blando*, Ait., affinis sed robustiore elatioreque habitu, inflorescentia ramosa, 3 segmentis superioribus fauce maculatis et staminibus violaceis declinatis differt.

Herba elata, robusta, 72—103 cm. alta. Cormus depresso-globosus, 1·5—2·4 cm. longus, 2—3·8 cm. diam., tunicis membranaceis.

indivisis, pallidis; caulis subteres, subflexuosus, robustus, glaber, 1—3-ramosus, 69 cm. longus (sine spica), 0·8 cm. diam. medio parte; folia basalia 4—7, erecta, stricta, plana, glabra, ensiformia, acuta vel acuminata, 27—46 cm. longa, 1·3—1·6 cm. lata; folia caulina 2; rami floriferi 1—3, saepissime ramulo brevi uno circa media praediti, erecto-patentes, subflexuosi, subteretes, glabri, 5—6 fl., 25—42·5 cm. longi, infimo circa 18 cm. a basi oriente; spica terminalis aequilateralis, axi substricto, tereti, glabro, 27—34 cm. longa, 9—12 fl., floribus suberectis; spathae valvae exteriores lineari- vel oblongo-lanceolatae, acutae vel acuminatae, interioribus longiores, infima ad 7·5 cm. longa, 0·9 cm. lata, illis medio circa 5 cm. longis, 0·8 cm. latis, illis ramorum circa 3 cm. longis; perianthii tubus parum curvatus, gracilis, 2·2—2·5 cm. longus, 0·35 cm. diam., segmentis albis pallide roseo suffusis, 3 superioribus macula sature rubente conspicue basi vero notatis; supremo ovato-oblongo, obtuso, 3·3 cm. longo, 1·9 cm. lato, lateralibus elliptico-oblongis, subacutis, 3 cm. longis, 1·4 cm. latis, 3 inferioribus elliptico-oblongis, aequalibus, obtusis, immaculatis vel rarius macula simile illae superiorum segmentorum sed minore pallidioreque, 2·9 cm. longis, 1·2 cm. latis; stamina parum magis quam dimidium segmentorum attingentia, antheris valde declinatis, curvatis, linearibus, lilacinis, 0·9 cm. longis; stylus (evolutus) 2/3 segmentorum attingens.—*G. blandus*, Andr., Bot. Rep. t. 99, *non Ait.* *G. blandus*, Ait. var. *albidus* Baker, in Fl. Cap. VI, 155.

Var. *β*, gracilior; tota planta multo graciliore humilioreque (ad 55 cm. alta); foliis linearibus, angustioribus (ad 0·7 cm. latis); spica 1—4 fl., haud ramis floriferis donatis, ceteris typicis.

Cape Province: South-Western Region; Worcester Div., Orchard Siding, — *Dicey*. Flowered in the National Botanic Gardens, Oct. 1914, No. $\frac{1217}{13}$ (Bolus Herb. No. 14844). Var. *β*: Bredasdorp Div., near Ratel River, alt. 100 ft, fl. Dec. 1896, *H. Bolus*, 8693.

Allied to *G. blandus*, Ait., from which the typical form of the present species differs in the more robust and taller habit, in the branched inflorescence, in the 3 upper segments being blotched at the throat, and in the violet-coloured declinate stamens.

The type described from living plants and the variety from dried material. It appears to agree very well with Andrews' figure. *G. blandus*, Ait., as understood by Baker, is probably too comprehensive, and will no doubt have to be split up as fresh material is available for comparison.

[illegible] (Gladiolus apiculatus, Bol. f. (§ *Eugladiolus*), cormo magno plantarum vetustarum, foliis linearibus ad basin apicemque attenuatis, post anthesin bene evolutus, spathae valva exteriore conspicue breviore quam interior, perianthii tubo longo, segmentis angustis et antherarum connectivo insigne producto bene distinguitur.

Cormus subglobosus vel rotundus, tunicis fibrosis, illis cormorum juniorum tenuibus crebrisque, vetustiorum rigidis, crassis, insigne crebrisque, 2·3—5·8 cm. longus, 2·4—5·8 cm. diam.; caulis substrictus vel flexuosus, teres, glaber, 15—52 cm. longus (sine spica) vel ultra, ad dimidium longitudinis vel minus in solo absconditus, basi foliorum numerosorum vestigiis fibrosis, ad 44 cm. longis circumdatus; folia juvenillima synantha, post anthesin bene evoluta; folia basalia 1—3, erecta, stricta, linearia, acuminata, plana, glabra, nervis primariis 3—4, subincrassatis, 14—32 cm. longa, 0·45—0·8 cm. lata; folia caulina 2—4, infima ad 5·5 cm. longa, summa valde reducta, rosea (siccis); spica aequilateralis, simplex, axi subflexuoso, tereti, glabro, 1·3—7·3 cm. longa, 3—5 fl., floribus suberectis; spathae valvae acutae vel acuminatae, rubido-roseae, exteriores lanceolatae vel lineari-oblongae, interioribus breviores, illis prope medium spicae 2·6—3·4 cm. longis, 0·5—0·65 cm. latis, interiores lineari-oblongae, 3—4·3 cm. longae, 0·4—0·8 cm. latae; perianthii tubus ± curvatus, gracilis, 2·4—6·3 cm. longus, segmentis lineari-oblongis, obtusis, nonnunquam minute apiculatis, ad basin gradatim attenuatis, subundulatis, tenuissime venosis, pallide roseis, 3 inferioribus media saturiore rosea linea notatis, 3 superioribus subaequalibus, 1·85—3·15 cm. longis, 0·4—0·55 cm. latis, summo parum longiore latioreque, 3 inferioribus subaequalibus, basi per quintum connatis labium efformantibus, 1·7—2·5 cm. longis, 0·4—0·6 cm. latis; stamina dimidium segmentorum attingentia, antheris linearibus, 0·8—1 cm. longis, connectivo ad 0·25 cm. extra cellulas producto; stylus (evolutus) fere ad apicem segmentorum vel minus attingens.

Cape Province: South-Western Region; Mossel Bay Div., Langeberg, fl. April, June, 1914, *J. Muir*, 1310; Vrijers Berg, alt. 1500 ft, fl. May, 1915, *J. Muir*, 2016.

Easily distinguished by the large corm of the older plants, by the linear leaves narrowed towards the base and apex, fully developed after the flowering period, by the outer spathe-valve being conspicuously shorter than the inner, by the long perianth-tube, the narrow segments, and by the remarkably produced connective of the anthers.

This species is remarkable in having the outer spathe-valves conspicuously shorter than the inner and in the produced connective of the anthers, two characters which I have not observed in any other species of the genus. Dr Muir remarks that the flowers appear in April before the leaves, these being fully developed in June.

Gladiolus magaliesmontanus, Bol. f. (§ *Eugladiolus*), *G. brachylimbus*, Baker (ex descriptione) affinis sed laminis foliorum vix evolutis, perianthii limbo dimidio tubi longiore et stylo saepe apicem segmenti summi bene superante differt.

Cormus ignotus; caulis erectus, substrictus, teres, glaber, 31 cm. longus (sine spica), 0·5 cm. diam. circa medium; folia basalia 4, erecta, glabra, nervis subprominentibus, laminis vix evolutis, vel summa ad 4·5 cm. longa, 0·55 cm. lata, vaginis 0·9—1·3 cm. latis, folium caulinum unum, 11 cm. longum; spica subsecunda, simplex, axi substricto, subtereti, glabro, 22·5 cm. longa, 10 fl.; spathae valvae lineari-oblongae, subacutae, exteriores (circa in media spica) 3·6 cm. longae, 0·9 cm. latae, interioribus parum brevioribus angustioribusque, valde minute bidentatis; perianthii tubus curvatus vel substrictus, superne infundibuliformis, 1·5—2·4 cm. longus, 0·3 cm. diam. circa medium, segmentis acutis, coccineis (in siccis), 3 superioribus late ellipticis 1·5—1·85 cm. longis, 0·9 cm. latis, 3 inferioribus lineari-oblongis, 1—1·25 cm. longis, 0·35—0·5 cm. latis (medio parum longiore); stamina apicem segmenti summi ± attingentia, antheris linearibus, 0·9—1 cm. longis; stylus apicem segmenti summi fere attingens vel bene superans, ramis circa 0·3 cm. longis.

Transvaal: Kalahari Region; Pretoria Div., Magaliesberg, near the Aapies River, alt. 5000 ft, fl. Nov. 1893, *R. Schlechter*, 3627.

Allied to *G. brachylimbus*, Baker (ex descr.) but differs in the leaf-blades being scarcely produced, in the perianth limb being longer than half the tube and in the style often well overtopping the uppermost segment.

Described from a single dried specimen, the flowers of which are in poor condition.

There has evidently been some confusion with regard to this plant. It was distributed by Schlechter as *Gladiolus* sp. Another plant, however, bearing the same number has been described as *Antholyza Schlechteri*, Baker.

non

Gladiolus marginatus, Bol. f. (§ *Hebea*), spica densissima, spathae valvis rubido-purpureo-marginatis et perianthii segmentis superioribus maculatis bene distinguitur.

Cormus ignotus; caulis suberectus, substrictus, teres, glaber, 34 cm. longus (sine spica); folia basalia 3, suberecta, laminis linearibus, acutis, planis, basin versus quasi teretibus (ob nervum medium incrassatum) glabris, nervo medio marginibusque incrassatis, 15—38 cm. longis, 0·2 cm. latis, folium caulinum unum, 8 cm. longum; spica secunda, simplex, densissima, axi substricto, subcomplanato, glabro, 18 cm. longa, 30 fl.; spathae valvae submembranaceae, tenue crebreque nervosae, late marginatae dimidio superiore rubido-purpureo, exteriores (circa in media spica) ovatae, subacutae, dimidio superiore subdeltoideae, 1·5 cm. longae, 0·9 cm. latae, interiores rhomboideo-ovatae, obtusae, 1·2 cm. longae, 1·1 cm. latae; perianthii tubus substrictus, dimidio superiore parum dilatatus, 1 cm. longus, segmentis unguiculatis, obtusis, summo elliptico, 1·9 cm. longo, 0·75 cm. lato, 2 lateralibus rhomboideis, 1·4 cm. longis, 0·7 cm. latis, 2 lateralibus inferioribus ovato-oblongis, 0·9 cm. longis, 0·5 cm. latis, medio oblongo, 1·05 cm. longo, 0·45 cm. lato, 3 superioribus pallide flavidis, profuse purpureo-maculatis, 2 lateralibus inferioribus purpureo-striatis et apice marginibusque purpureo-notatis, medio eodem colore parce maculatis; stamina stylusque dimidium segmenti summi attingentia, antheris linearibus, 0·55 cm. longis.

Transvaal: Kalahari Region; Lydenburg Div., near Lydenburg, fl. Jan. 1895, *Dr F. Wilms* (Herbarium of the Transvaal Museum, No. 6457).

Well marked by the very dense spike, the reddish-purple margins of the spathe-valves and by the spotted upper segments of the perianth.

Described from a single dried specimen in the Herbarium of the Transvaal Museum.

FUNGI

Meliola arcuata Doidge (*Plectascineae-Aspergillaceae*).

Velutina, maculas minutas, 1—2 mm. diam. irregulariter rotundatas interdum confluentes, atras formans; hyphis ramosis, sinuatis, multo septatis, brunneis, circa 10·5—11μ crassis, demum anastomosantibus; hyphopodiis capitatis alternantibus 1-septatis, breviter stipitatis, 20—29μ × 10·5—11μ, capitulo irregulariter ovoideo, dentato vel lobulato; hyphopodiis mucronatis paucis oppositis, 14—18 × 7—9·5μ; setis mycelicis simplicibus, copiosis, arcuatis, interdum fere rectis, atris, opacis, apice acuto, impariter crassis, 7—11μ, longis 295—330μ; peritheciis intra setas absconditis, atris, 115—150μ diam.; ascis 2-sporis, mox evanescentibus; sporidiis ellipsoideo-oblongis, utrinque rotundatis, 4-septatis, fuscis, leviter constrictis, 50—54 × 14—16μ.

On stems of *Viscum* sp., Kentani, 1 June, 1912, and 4 August, 1914. (*Pegler*, 1881 and 1949; *Pole Evans*, 2364 and 8389.)

Meliola Peglerae Doidge.

Epiphylla, sub-crustacea, atra, maculas minutas, orbiculares, 1—3 mm. diam. demum confluendo majores formans; mycelio peritheciigero atro, composito ex hyphis, atro-brunneis, dense septatis, cellulis circa 8—14 × 7—9 μ, ramis anastomosantibus, hyphopodiis capitatis numerosis, alternantibus vel unilateralibus, bicellularibus, breviter stipitatis, ad hyphas appressis; cellula stipitis circa 7 × 4—7 μ; superiore majore, obovoidea, plerumque retorta, 14—18 × 7—11 μ, hyphopodiis mucronatis paucis, oppositis, 14—22 × 7 μ, ampullaceis; setis nullis; peritheciis in plagulis centrum versus confertulis, atris, rugulosis, 126—235 μ diam.; ascis 2—4-sporis evanescentibus; sporidiis oblongatis utrinque rotundatis, 4-septatis, ad septa vix constrictis 29—43 × 18 μ.

On leaves of *Anastrabe integerrima,* Kentani, 4 June, 1912. (*Pegler,* 1883; *Pole Evans,* 2363.)

Epichloe Eragrostis Pole Evans (*Hypocreales-Clavicipiteae*).

Stromatibus inflorescentibus destruentibus, sclerotioideis, subcylindraceo-typhoideis, 3·5—6 cm. longis, 3—4 mm. latis, primo rubicundis conidiophoris, demum nigrificantibus, ostiolis potius prominulis, intus albus; peritheciis ovoideo-elongatis vel ellipsoideis, 300—360 × 120—150 μ; ascis cylindraceis, apice rotundato-tunicatis, circa 60—93 × 3·5—4 μ, octosporis, aparaphysatis; sporidiis filiformibus, ascorum longitudine, circa 1—1·5 μ, crassis, hyalinis, haud septatis.

On haulms of *Eragrostis plana,* Kentani, 29 February, 1912 (*Pegler,* 1855; *Pole Evans,* 2076).

Note.—*Epichloe Cinerea* B. & Br. is described on *Eragrostis nutans* from Ceylon, but the description is far too meagre to be of any value for identification purposes.

Montagnella Peglerae Pole Evans (*Dothideales-Dothideaceae*).

Stromatibus hypophyllis, sparsis vel gregariis hemisphaerico-pulvinatis, atris, circa $\frac{1}{4}$—$\frac{1}{2}$ mm. diam.; peritheciis in stromate superficialibus; ascis clavulatis vel clavato-cylindraceis, basi attenuatis brevissimeque stipitatis sed ad apicem rotundatis et crasse tunicatis, 70—85 × 20—28 μ, octosporis, aparaphysatis; sporidiis plerumque distichis vel saepe etiam tristichis, subfusoidiis, utrinque leniter attenuatis, triseptatis, ad septum medium plerumque constrictis, 27—30 × 6—8 μ, primo hyalino dein olivaceis.

On living plants of *Rapanea melanophleos,* Kentani, 3 April, 1912, and May, 1913. (*Pegler,* 1865 and 1892; *Pole Evans,* 2206 and 6620.)

Puccinia Kentaniensis Pole Evans (*Uredinales-Pucciniaceae*).

Soris teleutosporiferis amphigenis vel petiolicolis nervos saepe sequentibus, maculis exaridis vel irregularibus pallidis insidentibus, interdum tuberculiformibus, solitariis vel in crustas elongatas confluentibus, durissimis, primo epidermide tectis, dein irregulariter erumpentibus, atro-brunneis; teleutosporis oblongis vel subclavatis, apice rotundatis et non incrassatis vel obtuse attenuatis et incrassatis (usque 6μ), medio leniter constrictis, basi plerumque attenuatis, levibus, brunneis, 30—35 × 15—21μ, pedicello brevi, plerumque 12—15μ longo vel interdum usque 35μ longo, hyalino, caduco.

On living plants of *Toddalia lanceolata,* Kentani, 17 December, 1914. (*Pegler,* 1960; *Pole Evans,* 8793.)

Puccinia Digitariae Pole Evans n. sp.

Soris uredosporiferis plerumque hypophyllis, sparsis vel confluentibus, minutis, rotundatis vel oblongis, pulverulentis, flavidis; uredosporis globosis, subglobosis vel ovatis, echinulatis, dilute brunneis, 21—30 × 18—24μ; soris teleutosporiferis conformibus, obscurioribus, parce adhuc evolutis; teleutosporis ovato-ellipsoideis vel ovatis, apice rotundatis, incrassatis (usque 6μ), medio leniter constrictis, basi attenuatis, levibus, brunneis, 33—39 × 18—21μ; pedicello brevissimo, persistenti, brunneolo.

On leaves of *Digitaria debilis* Willd., Kentani, 5 June, 1912. (*Pegler,* 1879; *Pole Evans,* 2372.)

Ravenelia Peglerae Pole Evans (*Uredinales-Pucciniaceae*).

Soris teleutosporiferis amphigenis vel plerumque petiocolis, irregulariter distributis vel aggregatis, rufo-brunneis; capitulis solitariis vel dense aggregatis, subglobosis vel subhemisphaericis, castaneo-brunneis, levibus, 60—96μ diam., ex 8—9 sporis in omni directione compositis; sporis singulis continuis, ad apicem incrassatis (4—5μ), angulatis 25—30 × 10—14μ; cystidiis eodem numero quo sporis marginalibus, in aqua intumescentibus; pedicello hyalino, brevi, composito, deciduo.

On leaves, petioles and pods of *Acacia eriadenia,* Kentani. 21 May, 1912, and 23 June, 1912. (*Pegler,* 1874 and 1876; *Pole Evans,* 2331 and 2544.)

ON THE FLORA OF KENTANI

By A. PEGLER, A.L.S.

(*Continued from* p. 14.)

LEGUMINOSAE

Rafnia elliptica, Thunb. Cebe, coast near station, 2067; rare, 9.
Lotononis cytisoides, Benth. Kentani, hill-slopes, 389; frequent, 4.
Lotononis carnosa, Benth. Cebe, veld, 1363; occasional, 10.
Aspalathus laricifolia, Berg. Kentani, grassy slopes, 328; occasional, 2.
Aspalathus spinosa, Linn. Kentani, coast, 448; occasional, 4.
Buchenroedera multiflora, E. & Z. Kentani, coast slopes, 435; common, 7.
Buchenroedera umbellata, Harv. Lusizi, veld, 1268; locally frequent, 10.
Dichilus gracilis, E. & Z. Kentani, valleys, 673; rare, 12.
Crotolaria obscura, DC. Kentani, grassy slopes, 217; rare, 11.
Crotolaria distans, Benth. Kentani, hill-slopes, 1194; rare, 4.
Crotolaria capensis, Jacq. Kentani, chiefly along streams, 399; common, 1—3.
Argyrolobium speciosum, E. & Z. Kentani, grassy slopes, 121; common, 11—12.
Argyrolobium tuberosum, E. & Z. Kentani, grassy valleys, 124; frequent, 9—10.
Argyrolobium stipulaceum, E. & Z. Kentani, hill-side, 863; locally frequent, 10.
Argyrolobium molle, E. & Z. Kentani, valleys, 1456 and 144; occasional, 9.
Argyrolobium Andrewsianum, Steud. Kentani, edge of forests, 456; occasional, 2—3.
Argyrolobium amplexicaule, Harv. Kentani, grassy slopes, 1148; occasional, 11.
Trifolium Burchellianum, Ser. Kentani, veld in patches, 1272; occasional, 10—12.
Psoralea pinnata, Linn. Kentani, marshy places in valleys, 255; 11—1.
Indigofera dimidiata, Vögel. Kentani, hill-slopes, 93; occasional, 9—10.
Indigofera hedyantha, E. & Z. Kentani, valleys, 861; occasional, 9—10.
Indigofera hilaris, E. & Z. Kentani, grassy slopes after burnt grass, 55 and 310; 7—11.
Indigofera cylindrica, DC. Kentani, in forests, 430; frequent, 11—12.

Indigofera tristis, E. Mey. Kentani, veld, under shelter of trees, 1819; occasional, 1—2.

Indigofera sp. Kentani, among tall valley grasses, 1465 and 1455; locally frequent, 8—9.

Tephrosia polystachya, E. Mey. Kentani, valleys, 404; frequent, 1—2.

Tephrosia capensis, Pers. Kentani, veld, coast, 1295; frequent, 11—2.

Tephrosia grandiflora, Pers. Kentani, generally along streams, 458; common, 7—12.

Tephrosia macropoda, E. Mey. Kentani, veld, 457, 668, 1362; common, 11—1.

Milettia caffra, Meisn. Kentani, forests, 1215; frequent, 7—8.

Lessertia Harveyana, L. Bolus. Kentani, valley, 1281; rare, 11.

Lessertia perennans, DC. Kentani, usually near streams, 152; frequent, 11—12.

Zornia tetraphylla, Mich. Kentani, veld, 169; frequent, 2—3.

Desmodium Sealpc, DC. Kentani, along forest streams, 451; rare, 12.

Pseudarthria Hookeri, W. & Arn. Kentani, valley, seen only in two patches, 697; 3.

Alysicarpus Wallichii, W. & Arn. Kentani, hill-slope, valleys, 163, 650, 1459; rare, 10—2.

Hallia asarina, Thunb. Kentani, near village, 414; locally frequent, 2—3.

Glycine javanica, Linn. Kentani, outskirt of woods, 1442; rare, 2—3.

Teramnus labialis, Spreng. Kentani, veld, 1443; rare, 2—3.

Erythrina caffra, Thunb. Kentani, forests, 89; common, 8—9. Natives take the flowering as a sign to start ploughing.

Erythrina caffra, Thunb. Cat's Pass, 1134; 9. With yellow flowers instead of the usual red.

Erythrina Humeana, Spreng. Kentani, among tall valley grasses, 1179; occasional, 12—2.

Erythrina tomentosa, R. Br. Kobonqaba and Cebe, 235; occasional, 8—9.

Canavalia obtusifolia, DC. Black Rock Cove, on sea-beach, 1489; frequent, 12—1.

Vigna vexillata, Benth. Kentani, grassy slopes, 165; frequent, 10—11.

Vigna triloba, Walp. Kentani, valleys and waste land, 1331; common.

Dolichos Lablab, Linn. Kentani, edge of woods, 1444; frequent, 2—3.

Dolichos angustifolius, E. & Z. Kentani, valleys, 90; frequent, 10—11.

Dolichos falciformis, E. Mey. Near Bogotwana Mouth, 278; locally frequent, 11—12.

Dolichos sp. Kentani, along streams, 1178; frequent, 2—3. Worth cultivating.

Rhynchosia grandifolia, Harv. Kentani, among tall valley grasses, 185; occasional, 10.

Rhynchosia adenodes, E. & Z. Kentani, outskirts of woods, 455; frequent, 3—5. Twiner.

Rhynchosia adenodes, E. & Z. Kentani, valleys among grasses, 156; common, 3—5. Erect.

Rhynchosia Harmsiana, Schltr. Kentani, valleys, 2032 and 1507; occasional, 2—3.

Rhynchosia Orthodanum, Benth. Kentani, valleys, 889; common, 2—3.

Rhynchosia caribaca, DC. Kentani, twining round shrubs, 2028; 6.

Eriosema cordatum, E. Mey. Kentani, veld near village, 183; locally frequent and yet have never seen fruit, 10—2.

Eriosema salignum, E. Mey. Kentani, grassy slopes, 122; common, 10—12.

Eriosema Kraussianum, Meisn. Kentani, grassy slopes, 182; frequent, 10—12.

Eriosema Zeyheri, E. Mey. Kentani, grassy slopes, 1230; frequent, 10—12.

Abrus pulchellus, Wall. Black Rock Cove, 669; 1.

Dalbergia obovata, E. Mey. var. Schönlandii. Kentani, forests, 671; frequent, 12.

Calpurnia sylvatica, E. Mey. Kentani, forests, 155; occasional, 1—3.

Cassia mimosoides, Linn. Kentani, valleys, erect among tall grasses, 1177; frequent, 2—3. Leaves sensitive to touch and light.

Cassia mimosoides, Linn. Black Rock Cove, 1296; frequent, 11—12. Decumbent habit, smaller leaves, larger flowers.

Cassia mimosoides, Linn., var. β capensis. Kentani, veld, 381; 12—2.

Bauhinia Bowkeri, Harv. Kei Hills, near Mouth of Kei, 670; 11—12.

Schotia latifolia, Jacq. Kentani, forests, 593; occasional, 12.

Caesalpinia sepiaria, Roxb. Manubi, outside forest, 1262; 10. Said to be used for kraals.

Entada natalensis, Benth. Kentani, in forests, 557; common, 12—1.

Acacia Benthamii, Rochebr. Kentani, coast veld, 672; frequent, 12—1.

Acacia caffra, Willd. Kentani, veld, rarely in forests, 357; universal, 11—2.

Acacia caffra, Sond., var. tomentosa. Qolora valley, 1297; occasional, 1.

Acacia eriadenia, Benth. Kentani, valleys, 49, 669 (?); common, 7—10.

ROSACEAE

Pygeum africanum, Hook. Kentani, forests, 904; occasional, 9—10.

Rubus rigidus, Sm. Kentani, valleys and waste land, 382; frequent, 12—2.

Rubus pinnatus, Willd. Kentani, valleys and near homesteads, 1256 and 143; common, 6—12.

Alchemilla capensis, Thunb. Fairview, among *Erianthus*, 1506; locally frequent, 4.

Agrimonia eupatoria, Linn., var. capensis, Harv. Kentani, valleys, 411; common, 2—3.

Cliffortia serpyllifolia, Ch. & Schl. Kentani, valleys among tall grasses, 1166; locally frequent, 1—2.

Cliffortia linearifolia, E. & Z. Kobonqaba Drift, 1394; locally frequent, 11—12.

SAXIFRAGEAE

Choristylis rhamnoides, Harv. Kentani, woods, 700; rare, 1—2.

CRASSULACEAE

Crassula falcata, Willd. Near Qolora Mouth, 527 and 1479; occasional, 12—1.

Crassula vaginata, E. & Z. Kentani, veld, 439; common, 2—3.

Crassula crenulata, Harv. Kentani, valleys, hill-slopes among coarse grasses, 1167; "more luxuriant than usual" (Schönland), 2—3.

Crassula Turrita, Linn. Near Black Rock Cove, 2073 and 1312; occasional, 10—12.

Crassula rosularis, Harv. Hill-side at Qolora Mouth, 1427; locally frequent, 7.

Crassula ericoides, Harv. Bordering flat stones near Kentani Residency, 470; locally frequent, 2.

Crassula brachypetala, E. Mey., var. parvisepala, Schönl. Kentani, marshy places, 474; common.

Crassula obvallata, Linn. 1842; 7.

Crassula inanis, Thunb. Kentani, marshy places, vleis, 792; occasional, 12.

Crassula multicava, Linn. Kentani, Black Pool on shaded rocky hill, 839 and 1205; common, 7—1.

Crassula Flanaganii, Schönl. et Bak. f. Kentani, ledges of rock overhanging stream, 1336; rare, 2—3.

Crassula torquata, Bak. Black Rock Cove, veld, 1428; occasional, 7.

Crassula planifolia, Schönl. Kobonqaba Hills, trailing over rocks, 1454; locally frequent, 9.

Crassula Peglerae, Schönl. Kentani, bordering flat stones on hill-slope, 1181; locally frequent, 3—4.

Kalanchoe crenata, Harv. Kentani, forest valley, 843; rare, 7—10.

Kalanchoe rotundifolia, Harv. Kentani, rocky places overlooking streams, 1104; common, 2—5. "Leaves larger than type" (Schönland).

Cotyledon virescens, Schönl. et Bak. f. Gogwana Mouth, 1347; frequent, 7—12.

Cotyledon Woodii, Schönl. Kei Hills on krantzes, 2029; 11.

DROSERACEAE

Drosera pauciflora, Banks. Kentani, among Erianthus on valley slope, 2065. Seen once only.

HAMAMELIDEAE

Trichocladus crinitus, Pers. Kobonqaba River, 880; rare, 1.

Trichocladus ellipticus, E. & Z. Kentani, in woods, 77; occasional, 6.

HALORAGEAE

Serpicula repens, Linn. Kentani, in marshes and slow-running streams, 1333; common, 1—2.

Gunnera perpensa, Linn. Kentani, along streams, 153; common, 9—10.

RHIZOPHORACEAE

Weihea Flanaganii, Schinz. Kentani, woods, 833; occasional, 7.

Peglera capensis[1], Bolus. Manubi Forest, 1269; only one tree seen, 10.

COMBRETACEAE

Combretum glomeruliflorum, Sond. Kentani, in woods, 995; common, 11. Young leaves so pale as to be sometimes mistaken for creamy-coloured flowers; turning lovely reds in autumn.

MYRTACEAE

Eugenia Zeyheri, Harv. Kentani, in woods, 856; fairly common, but seems to blossom seldom, 9.

Eugenia albanensis, Sond. Near Black Rock Cove, veld, 1310; common, 11—12. Fruit about size of apricot, delicious.

Eugenia capensis, Harv. Black Rock Cove, among beach scrub, 872; frequent, 11—2.

Eugenia cordata, Laws. Black Rock Cove, Cebe, Silverstream, 480; common, 12—4.

LYTHRARIEAE

Lythrum hyssopifolium, Linn. Black Rock Cove, Silverstream, in marshy ground, 873; rare, 1.

Nesaea floribunda, Sond. Near Black Rock Cove along stream, 2118; 4. Flowers purplish, frail.

ONAGRARIEAE

Epilobium hirsutum, Linn. Kentani, marshy ground, 179; occasional, 1—2.

Epilobium neriophyllum, Hausskn. Kentani, along streams, 1161; frequent, 11—12.

Ludwigia palustris, L. Kentani, in shallow streams, 1151; frequent, 11—12.

Oenothera tetrapterum, Raum. Kentani, waste land, 2101; 11.

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[1] = Nectaropetalum capense, Stapf & Bodle.

PASSIFLOREAE

Ophiocaulon gummifera, Hook. f. Near Black Rock Cove, valleys, 869; frequent, 1—2.

Acharia tragioides, Thunb. Kentani, outskirts of woods and along banks, 757; occasional, 2—4.

Ceratiosicyos Ecklonii, Nees. Kentani, outskirts of woods, 903; common, 11—2.

CUCURBITACEAE

Trochomeria Hookeri, Harv. Kentani, valleys, 1197; rare, 11—12.

Momordica cordifolia, Sond. Kentani, climbing outskirts of woods, 364; common, 11—2.

Cucumis myriocarpus, Naud. Kentani, usually along disused footpaths, 424; occasional, 2—3.

Cucumis hirsutus, Sond. Near Black Rock Cove, veld, 1300 and 1301; rare, 11—12.

Cephalandra quinqueloba, Schrad. Kentani, climbing outskirts of woods, 436; frequent, 2—3. Striking fruit.

Melothria punctata, Cogn. Kentani, outskirts of woods, 1513 and 478; common, 6—7.

Gerrardanthus macrorhiza, Harv. Near Columba Mission, 628; rare, 11—1.

Luffa spherica, Sond. Kentani, climbing up forest trees, and blossoming on top (perhaps because not easily seen from below), 154; rare, 2.

Toxanthera natalensis, Hook. f. Hoek valley, 1280; rare, 11. "We have only had this from Natal" (Bolus).

? Coniandra Zeyheri, Schrad. Black Rock Cove, forest climber, 477; 4.

BEGONIACEAE

Begonia natalensis, Hook. Near Qolora Mouth, 813; frequent, 10—2.

FICOIDEAE

Mesembrianthemum acinaciforme, Linn. Black Rock Cove, in grasses and on beach, 1317; common, 11—2.

Mesembrianthemum edule, Linn. Black Rock Cove, veld, 1315; common, 11—1.

Mesembrianthemum angulatum, Thunb. Black Rock Cove, edge of scrub in sea-sand, 1313; common, 11—12.

Mesembrianthemum cordifolium, Linn. f. Hoek Valley, trailing over rocks. 1285; rare, 11—12.

Mesembrianthemum tradescantioides, Berger. Hoek Valley, trailing over rocks, 1284; rare, 11—12.

Mesembrianthemum incomptum, Harv. Black Rock Cove, veld, 1316; occasional, 11—1.

Tetragonia decumbens, Mill. Black Rock Cove, on sea-beach and in bordering scrub, 1314; common, 11—1.

Pharnaceum distichum, Thunb. Black Rock Cove, veld, 2019; locally frequent, 12.

UMBELLIFERAE

Hydrocotyle bonariensis, Lam. Black Rock Cove, on sea beach, 1488; common, 12—1.

Hydrocotyle asiatica, Linn. Black Rock Cove, on sea beach, 1487; common, 12—1.

Hydrocotyle eriantha, Rich. Kentani, veld and gardens, a troublesome weed, 688; universal, 12—3.

Hydrocotyle Centella, Ch. & Schl. Black Rock Cove and Silverstream, 793; common, 12—2.

Alepidea amatymbica, E. & Z. Kentani, hill-slopes, 353; common, 2—3.

Bupleurum Mundtii, Ch. & Schl. Kentani, valleys, among tall grasses, 198; common, 10—11.

Heteromorpha arborescens, Ch. & Schl. Kentani, forests, 6 and 10; frequent, 7.

Lichtensteinia interrupta, E. Mey. Kentani, slopes among tall grasses, 891; locally frequent, 11—12.

Apium graveolens, Mett. Black Rock Cove, swampy places, 304; frequent, 11—12.

Ptychotis Meisneri, Sond. Columba, in woods, 1212; locally frequent, 7—8.

Sium Thunbergii, DC. Gogwana Mouth, 1486; occasional, 12—1.

Pimpinella stadensis, Harv. Kentani, hill-slope, between stones, 405; occasional, 12—2.

Pimpinella caffra, Harv. Kentani, valleys among tall grasses, 172; common, 10—12.

Cnidium suffruticosum, C. & S. Black Rock Cove, on beach, 892; frequent, 7.

Peucedanum capense, Sond. Kentani, valleys, among tall grasses, 12; common, 6—7.

Peucedanum Meisnerianum, MacOwan. Kentani, grassy slopes, 1153; frequent, 9—11.

ARALIACEAE

Cussonia spicata, Thunb. Kentani, in forests, 1115; frequent, 4. Slender, single stem.

Cussonia spicata, Thunb. Kentani, hill-slopes, shrubby; common, 4.

CORNEAE

Curtisia faginea, Ait. Kentani, in woods, 1332 and 1340; frequent, 1.

RUBIACEAE

Oldenlandia Amatymbica, Benth. & Hook. Kentani, veld, 119; common, 9—11.

Oldenlandia natalensis, Kuntze. Kentani, chiefly under shelter of Acacia Karrooa, 413; common, 9—2.

Burchellia capensis, R. Br. Kentani, along streams and in woods, 483; common, 7—12.

Randia rudis, E. Mey. Kentani, hill-slopes, 590; occasional, 10—12.

Gardenia globosa, Hochst. Kentani, forests, 808; frequent, 10—11.

Gardenia Neuberia, E. & Z. Kentani, forests, 331; common, 1—2. Favourite host of small orchids.

Gardenia Thunbergii, L. Kentani, forests, 432; common, 2. Period of bloom very limited.

Oxyanthus Gerrardii, Sond. Kentani, forests, 334; occasional, 2. Period of bloom sudden and short.

Tricalysia lanceolata, K. Schum. Kentani, forests, 804; common, 10.

Tricalysia capensis, Sim. Manubi forest, 1265; frequent, 10.

Pentanisia variabilis, Harv. Kentani, grassy slopes, 80; common, 9—2.

Plectronia ventosa, Linn. Near Black Rock Cove, 702; occasional, 10—11.

Plectronia pauciflora, Kl. Kentani, woods, 475; common, 6—8.

Vangueria macrocalyx, Sond. Near Black Rock Cove, on sand-dunes, 702; 11—12.

Pavetta caffra, Thunb. Qolora Drift, 1324; occasional, 12.

Pavetta obovata, E. Mey. Black Rock Cove, 485; common, 11—1.

Pavetta lanceolata, Ecklon. Near Black Rock Cove, 1343 and 1323; common, 11—1.

Pavetta natalensis, Sond. Silverstream, woods, 2064; 12.

Galopina circaeoides, Thunb. Kentani, valleys, damp sheltered places, 383; common, 1—2.

Galopina aspera, Sond. Kentani, among tall valley grasses, 312; common, 1—2.

Anthospermum lanceolatum, Thunb. Kentani, edge of woods, 790; common, 3—4.

Anthospermun hedyotideum, Sond. Kentani, veld, 19; common, 9—12.

Anthospermum aethiopicum, Linn. Veld near Black Rock Cove, 2083 and 830; common, 7.

Anthospermum littoreum, L. Bolus. Near Black Rock Cove, 2139; common, 3.

Spermacoce natalensis, Hochst. Kentani, veld, 19; common, 10—2.

Rubia cordifolia, Linn. Black Rock Cove, scrambling over under-shrubs, 378; frequent, 3—4.

Rubia cordifolia, Linn. Kentani, in woods, 412; frequent, 1—2. Much smaller and smoother than 378.

Grumilia globosa, Hochst. Kentani, in woods, 178; common, 6—12.

Canthium obovatum, Kl. Black Rock Cove bordering beach, 51; rare, 12.

VALERIANEAE

Valeriana capensis, Thunb. Kentani, valleys, marshy ground, 197; frequent, 9—11.

DIPSACEAE

Cephalaria attenuata, Kunth. Kentani, among tall valley grasses, 361; locally frequent, 10—2.

Scabiosa Columbaria, Linn. Black Rock Cove, veld; Silverstream, veld, 410 and 385; frequent, 12—4.

Scabiosa Buekiana, E. & Z. var. glabra. Black Rock Cove, veld, 388; frequent, 12.

Scabiosa Tysonii, L. Bolus. Kentani, hill-slope, 715; rare, 12.

COMPOSITAE

Ethulia conyzoides, Linn. Qolora Mouth, marshy ground, 61 and 1437; occasional, 4—7.

Vernonia anisochaetoides, Sond. Kentani, forests, 1113; common, 7—8.

Vernonia mespilifolia, Less. Kentani, woods, 329; common, 2—3.

Vernonia corymbosa, Linn. Kentani, along stream, 2031; rare, 3—4.

Vernonia Kraussii, Sch. Bip. Kentani, margin of woods, 64; frequent, 10—11.

Vernonia Kraussii, Sch. Bip. Kentani valleys, 681; common, 11—12. Much larger than 64. "64 and 861 are two extreme forms of V. Kraussii" (Bolus).

Vernonia pinifolia, Less. Kentani, valleys, 680; frequent, 11—12.

Vernonia hirsuta, Sch. Bip. Kentani, among tall grasses, 236; occasional, 11. After grass fire in May.

Vernonia crataegifolia, Hutchinson. Kentani, valleys, 999; occasional, 4.

Vernonia Dregeana, Sch. Bip. Kentani, grassy slopes, 60; 9.

Adenostemma caffrum, DC. Kentani, along stream, 674; rare, 4.

Mikania capensis, DC. Kentani, margin of woods, 2; common, 7—9.

Dichrocephala latifolia, DC. Kentani, garden weed, 1378; common, 10—11.

Aster hispidus, Baker. Kentani, hill-slopes, 215; occasional, 8—10.

Erigeron canadense, L. Kentani, garden weed, 21; common, 1—3.

Nidorella resedaefolia, DC., var. β, rapunculoides. Kentani, valleys among tall grasses, 1175; occasional, 1—3.

Nidorella auriculata, DC. Kentani, valleys and Black Rock Cove, 425 and 1492; common, 12—5.

Microglossa mespilifolia, Benth. Blackpool, 135; locally frequent, 9—10.

Conyza pinnatilobata, DC. Kentani, valleys among tall grasses, 1176; occasional, 2—3.

Conyza incisa, Ait. Kentani, marshy places, 181; occasional, 10—11.

Conyza ivaefolia, Less. Kentani, waste places, 2025; common, 1—5.

Tarchonanthus camphoratus, L. Hill overlooking Qolora Mouth, 2122; 4.

Brachylaena elliptica, Less., var. β salicinea, DC. Blackpool, 1521; occasional, 4—5.

Brachylaena elliptica, Less. Silverstream, 997; occasional, 3—4.

Brachylaena elliptica, Less. Black Rock Cove, 38; occasional, 7. Much broader leaves.

Brachylaena discolor, DC. Kentani, outskirts of forests, 38 A; 7.

Denekia capensis, Thunb. Driz Vlei, 36; frequent, 6.

Sphaeranthus peduncularis, DC. Cebe and near Black Rock Cove, in marshy ground, 866; locally frequent, 10—12.

Gnaphalium luteo-album, Linn. Kentani, waste lands, 2079 and 1376; common, 9—11.

Helichrysum ericaefolium, Less. Gogwana Mouth, hill-slope, 1483; locally frequent, 12—1.

Helichrysum felinum, Less. Kentani, valleys among tall grasses, 106; common, 9—10.

Helichrysum setosum, Harv. Near Black Rock Cove, veld, 676; common, 9—10.

Helichrysum foetidum, Cass. Kentani, among tall valley grasses, 998; occasional, 2—3.

Helichrysum squamosum, Thunb. Silverstream and Black Rock Cove, 281; frequent, 11—1.

Helichrysum umbraculigerum, Less. Kentani, valleys and damp places in veld, 675; common, 11—1.

Helichrysum pedunculare, DC. Near Black Rock Cove, veld, 1322; locally frequent, 11—12.

Helichrysum undatum, Less., var. β pallidum. Kentani, veld slopes, 62; frequent, 9.

Helichrysum allioides, Less. Kentani, hill-slopes, 678; frequent, 11—12.

Helichrysum leiopodium, DC. Kentani, grassy slopes, 1422; common, 2.

Helichrysum quinquenerve, Less. Kentani, valleys, 228; common, 10—11.

Helichrysum cephaloideum, DC. Kentani, veld, 254; common, 10—12.

Helichrysum appendiculatum, Less. Kentani, veld, 253; common, 10—12.

Helichrysum odoratissimum, Less. Kentani, veld, 229; fast monopolizing the pasturage, 10—12.

Helichrysum cymosum, Less. Kentani, plantation and more frequent near Black Rock Cove, 683; 10—12.

Helichrysum simillimum, DC. Kentani, veld, 1334; occasional, 12—2.

Helichrysum teretifolium, Less. Coast near Cebe along beach-scrub, 1122; 9—10.

Helichrysum erosum, Harv. Kentani Hill, 1491; rare, 12—2.

Helichrysum auriculatum, Less. Kentani, valleys among tall grasses, 677; common, 10—12.

Helichrysum agrostophilum, Klatt. Kentani, hill-slopes, 86; common, 10—12.

Leontonyx squamosus, DC. Kentani, hill-slopes among short grasses, 854; occasional, 10—12.

Stoebe insignis, Harv. Columba, after burnt grass, 1345; occasional, 6.

Disparago ericoides, Gaertn. Veld near Black Rock Cove, 260; locally frequent, 4.

Metalasia muricata, Less. Veld near Black Rock Cove, 54; occasional, 7.

Relhania pungens, L'Hérit. Veld near Black Rock Cove, 317; frequent, 11—1.

Athrixia phylicoides, DC. Kentani, hill-slopes, 105; occasional, 5—7.

Pulicaria capensis, DC. Kentani, along streams; occasional, 1—2.

Xanthium spinosum, Linn. Kentani, waste land, 2068; common garden weed, 1—3 (?).

Xanthium strumarium, Linn. Like the above, 1501; doing much damage to wool, 1—3 (?).

Melanthera Brownei, Sch. Bip. Black Rock Cove, 420; frequent, 11—2.

Spilanthes Acmella, Linn. Kentani, along streams, 1346; a troublesome garden weed, 6—12.

Bidens pilosa, Linn. Kentani, an obnoxious weed, taking entire possession of neglected mealie-gardens, 421; universal, perennial.

Athanasia acerosa, Harv. Kentani, valleys, 472; common, 5.

Athanasia punctata, Harv. Kentani, valleys, 462; common, 4.

Cotula anthemoides, Linn. Black Rock Cove, in damp places, 111; 4.

Schistostephium crataegifolium, DC. Kentani, valleys, 482; frequent, 4.

Schistostephium flabelliforme, Less. Kentani, valleys, 35; frequent, 5—7.

Schistostephium hippiaefolium, Benth. Kentani, bordering flat stones on hill-slope, 1509; rare, 4—5.

Artemisia afra, Jacq. Kentani, valleys, 170; common, 4.

Cineraria geifolia, Linn., var. Qolora Mouth, on ledges of rock, 1436; locally frequent, 6—7.

Cineraria lobata, L'Hérit. Black Rock Cove, in marsh, 446; locally frequent, 6—7.

Senecio pellucidus, DC. Kentani, around homesteads, and like *Bidens*, some flowering plants always to be found, 496; universal, perennial.

Senecio elegans, Linn. Mbogotwana, bank of stream on sea-beach, 1843; locally frequent, 6—7.

Senecio erubescens, Ait., var. Kentani, grassy slopes, 60; common, 9.

Senecio variabilis, Sch. Bip. Black Rock Cove, marshy ground, 1321; occasional, 12.

Senecio macrocephalus, DC. Kentani, damp valleys, 209; occasional, 11.

Senecio macrocephalus, var. β hirsutissimus. Kentani, veld, 180; common, 8—2.

Senecio speciosus, Willd. Kentani, marshy ground, in valleys, 452; occasional, 4—11.

Senecio purpureus, Linn. Kentani, marshy places and along streams, 1000 and 199; common, 10—12.

Senecio coronatus, Harv. Columba, veld, after grass fire, 1251; common, 9—10.

Senecio albanensis, DC., var. doroniciflorus. Kentani, hill-slopes, 473; occasional, 11—12.

Senecio albanensis, DC., var. γ angustifolius. Hill-slope near Nthlambi, 1420; locally frequent, 12.

Senecio decurrens, DC. Among tall valley grasses, 679; frequent, 11—12.

Senecio striatifolius, DC. Kentani, veld, 1388; occasional, 10—11.

Senecio bupleuroides, DC. Kentani, veld, 1174; common, 2—3.

Senecio oxyriaefolius, DC. Kentani, valleys, 227; common, 10—12.

Senecio rhomboideus, Harv. Kentani, outskirts of woods, 486; occasional, 6—7.

Senecio isatideus, DC. Kentani, valleys among tall grasses, 1402; locally common, 11—12.

Senecio serratuloides, DC. Kentani, hill-slopes, 476; common, 4—5.

Senecio oxyodontus, DC. Kentani, among tall grasses on hill-slopes, 1839; occasional, 5—6.

Senecio pterophorus, DC. Kentani, sociable, taking possession of waste lands, 996; universal, 3—4.

Senecio scoparius, Harv. Kentani, hill-slope among tall grasses, 1752; rare, 11—12.

Senecio picridifolius, DC. Kentani, marshy ground, 1753; rare, 4—5.

Senecio mikanioides, Otto. Kentani, forests, 449 and 1838; occasional, 4—5.

Senecio deltoideus, Linn. Kentani, forests, 465; frequent, 5—6.

Senecio quinquelobus, DC. Kentani, forests, 464; frequent, 5—6.

Senecio tamoides, DC. Kentani, forests, 498; frequent, 5—7.

Senecio angulatus, Linn. f. Kentani, among tall grasses, 2024; occasional.

Senecio brachypodus, DC. Kentani, in woods, 17; 6—8.

Senecio sp. Kentani, in woods, 481; 6—8.

Eclipta erecta, Linn. Kentani, damp places, small white flower, 137; 4.

Othonna carnosa, Less. Black Rock Cove, veld, 57; common, 6—8.

Dimorphotheca fruticosa, Less. Black Rock Cove, on sea-beach, 682; all the year round, but best in July; locally common.

Dimorphotheca Barberiae, Harv. Kei Hills, 686; 12.

Osteospermum herbaceum, Linn. Kentani, edge of woods, 504; common, 1—3.

Osteospermum moniliferum, L. Columba, under-shrub, 1252; locally frequent, 9—10.

Osteospermum grandidentatum, DC. Kentani, among tall grasses, 104; common, 10—2.

Osteospermum nervatum, DC. Kentani, veld, 919; common, 6—10.

Osteospermum sonchifolium, DC. Kentani, edge of forests and along streams, 1199; occasional, 5—7.

Ursinea apiculata, DC. Kentani, veld, 1214; occasional, 7—11.

Haplocarpha scaposa, Harv. Kentani, valleys, 1405; occasional, 10—12.

Cryptostemma niveum, Nichols. Black Rock Cove, growing on pure sea-sand, 685; common, 7—12.

Venidium decurrens, Less. Kentani, marshy places and a garden weed, 52; universal, 5—10.

Gazania longiscapa, DC. Common at Black Rock Cove, Silverstream, 836; occasional, 7—12. Natives strip back of leaves for thread fringes.

Berkheya echinopoda, O. Hoffm. Near Black Rock Cove, in veld, 440; 7—12.

Berkheya speciosa, O. Hoffm. Kentani, grassy valleys, 208; frequent, 10—11.

Berkheya acanthopoda, O. Hoffm. Kentani, subsocial, 431; common, 12—3.

Berkheya sonchifolia, O. Hoffm. Kentani, in woods, 1184; occasional, 1—3.

Berkheya seminivea, Harv. & Sond. Kentani, edge of woods, 461; common, 11—3.

Berkheya umbellata, DC. Kentani, valleys, 429; frequent.

Berkheya subulata, Harv., var. insignis. Near Columba, 1345.

Stephanocoma carduoides, Less. Kentani, valleys, 1173; common, 1—3.

Centaurea melitensis, Linn. Kentani, waste lands, 53; common, 9—10.

Gerbera piloselloides, Less. Near Black Rock Cove, 226; occasional, 7.

Gerbera viridifolia, Sch. Bip. Kentani, hill-slopes, 43; common, 8—9. Blossoms without leaves, in a depauperated form, very soon after grass fires.

Gerbera Kraussii, Sch. Bip. Columba, hill-slopes, 1400; locally frequent, 11—12; white flowers.

Gerbera Kraussii, Sch. Bip. Columba, hill-slopes, 1401; locally frequent, 11—12; yellow flowers.

Hieracium capense, Linn. Kentani, valleys, 1387; common, 10—12.

Crepis polyodon, Bolus. Kentani, valleys, 1413; rare, 10—12. Perhaps escaping notice, as flowers open only in morning sunshine.

Sonchus Dregeanus, DC. Kentani, valley waste lands, 1404; occasional, 10—11.

Urospermum picroides, Linn. Kentani, valley, waste lands, 1403; rare, 10—11.

Sonchus oleraceus, Linn. Kentani, valleys and waste lands, 1377; universal, 10.

GOODENOVIEAE

Scaevola Thunbergii, E. & Z. Black Rock Cove, on sea-shore, 1318; common, 11—1.

CAMPANULACEAE

Lobelia coronopifolia, Linn. Kentani, occupying a belt along coast, a few hundred feet above sea-level, 247; locally common, 10—7.

Lobelia anceps, Thunb. Kentani, marshy places, 497; occasional, 2. Frail and more slender than 501.

Lobelia Erinus, Linn. Kentani, valleys among grasses, 501; 10—4.

Lobelia anceps, Thunb. Black Rock Cove, in marshy places, 30; frequent, 11—1.

Lobelia scabra, Thunb. Kentani, damp valleys, 416; frequent, 2.

Lobelia aspera, A. DC. Kentani, valleys and waste land, 1278; frequent, 10—1.

Lobelia thermalis, Thunb. Nthlambi, along water-course, 1325; locally frequent, 12.

Cyphia heterophylla, Presl. Kentani, among tall valley grasses, 277; frequent, 11—1.

Cyphia persicifolia, Presl forma. Qolora Station, valley, 2098; rare, 10.

Lightfootia Huttoni, Sond. Kentani, veld, 1081; rare, 10.

Wahlenbergia stellarioides, Cham. Near Black Rock Cove, veld, 1308; frequent, 10—2.

Wahlenbergia oppositifolia, A. DC. Kentani, valleys and waste land, 1279; occasional, 10—12.

Wahlenbergia Zeyheri, E. & Z. Cebe veld, 1367; common.

ERICACEAE

Erica cerinthoides, Linn. Near Kobonqaba Mouth, 540; rare, 7.

PLUMBAGINEAE

Statice linifolia, Linn. f. Black Rock Cove, trailing over rocks just out of reach of tide, 302; frequent, 11—2.

Plumbago capensis, Thunb. Kei Hills and near Columba, 189; frequent, 10—2.

PRIMULACEAE

Lysimachia Woodii, Schltr. Kentani, along streams, 2016; occasional, 12.

Anagallis arvensis, Linn. Kentani, waste lands, 487; frequent, 10—12.

Anagallis tenella, Linn. Kentani, marshy ground, 212; frequent, 10—1.

Samolus Valerandi, Linn. Kentani, marshy ground, 360; frequent, 1—5.

MYRSINEAE

Maesa alnifolia, Harv. Kentani, shrubby, 2—3 ft. Usually sheltering under *Acacia caffra*, 701; common, 2—3.

Embelia Kraussi, Harv. Kentani, in woods, 1369; seen only in one place, 10.

Myrsine melanophlaeos, R. Br. Kentani, usually along streams, 733; common, 8—9.

SAPOTACEAE

Chrysophyllum natalense, Sond. Kentani, in woods, 859; frequent, 11.

Sideroxylon inerme, Linn. Kentani, in woods, 882; occasional, 1—2.

Mimusops caffra, E. Mey. Black Rock Cove, bordering beach, 1298; common, 11—2.

Mimusops marginata, N. E. Br. Kentani, forests, 692; rare, 4.

Mimusops obovata, Sond. Kentani, in forests, 765; occasional, 4—5.

EBENACEAE

Royena scabrida, Harv. Along Qolora River, 1245; rare, 9.

Royena villosa, Linn. Kentani, in woods, 468; common, 5.

Royena pallens, Thunb. Kentani, outskirts of woods, and under Acacia Karrooa, 1123; common, 9—10.

Royena Simii, O. Kze. Kentani, in woods, 844; common, 9—10.

Euclea lanceolata, E. Mey. Kentani, hill-slopes, 1117; occasional, 9—10.

Euclea natalensis A. DC. Near Black Rock Cove, along beach, 828; frequent, 7.

Euclea macrophylla, E. Mey. Kentani, in woods, 863; occasional, 11.

Maba natalensis, Harv. Gogwana Mouth, 2123; shrubby, about 4 ft high, 1.

OLEACEAE

Jasminum multipartitum, Hochst. Kobonqaba Hills, 1253; occasional, 9.

Jasminum tortuosum, Willd. ? Kentani, margin of woods, 2103.

Jasminum angulare, Vahl., var. glabratum, Mey. Kentani, margin of woods, 1810; 10—12.

Olea Peglerae, C. H. Wright. Kentani, in woods, common as re-growth, 819; 2.

Olea foveolata, E. Mey. Black Rock Cove, along beach, 826; 7.

Olea capensis, Linn. Black Rock Cove, along beach, 994; 12—1.

APOCYNACEAE

Carissa Arduina, Lam. Kentani, in woods, 532; common, 7—10.

Acokanthera venenata, G. Don. Kentani, in woods, 4; frequent, 7. Natives are said to chew the leaves as an antidote to snake-bite.

Rauwolfia natalensis, Sond. Along Qolora River and Manubi, 1133; frequent at latter place, 11.

Strophanthus speciosus, Reber. Kentani, in woods, 915; common, 11.

Oncinotis inandensis, Wood & Evans. Manubi Forest, 1261. Hitherto recorded only fron Natal; 10.

Asclepiadeae

Cryptolepsis capensis, Schltr. Kentani, in woods, 663; rare, 11—12.

Raphionacme divaricata, Harv. Near Black Rock Cove, on grassy slopes, 876; frequent, 11—1.

Tacazzea natalensis, N. E. Br. Kentani, in woods near streams, 916; occasional, 11.

Secamone Gerrardii, Harv. Kentani, in woods, 1274; occasional, 9—10.

Secamone Alpini, Schultes. Kentani, in woods, 662; common, 11—12.

Secamone frutescens, Decne. Kentani, in woods, 845; common, 10—11.

Xysmalobium involucratum, Decne. Kentani, grassy slopes, 118; common, 11—1.

Xysmalobium undulatum, R. Br. Kentani, grassy valley slopes, 691; occasional, 11—1.

Xysmalobium orbiculare, D. Dietr. Kentani, grassy slopes, 653 and 887; occasional, 11—1.

Schizoglossum cordifolium, E. Mey. Kentani, veld, 1144; rare, 11—12.

Schizoglossum hamatum, E. Mey. Kentani, veld, among tall grasses, 133; frequent, 10—11.

Schizoglossum tridentatum, Schltr. Kentani, veld valleys, 184; frequent, 11—1.

Schizoglossum diversum, N. E. Br. Kentani, grassy slopes, 661; frequent, 11—1.

Schizoglossum Peglerae, N. E. Br. Near Black Rock Cove, 1289; rare, 10—12.

Schizoglossum anomalum, N. E. Br. Kentani, veld, 2055; one plant only seen, 10—11.

Schizoglossum filifolium, Schltr. Kentani, hill-slopes, 660; common, 11—1.

Asclepias expansa, Schltr. Kentani, grassy slopes, 1481 and 216; occasional, 12—2.

Asclepias patens, N. E. Br. Kentani, grassy valley slopes, 366; common, 10—2.

Asclepias peltigera, Schltr. Kentani, grassy valley slopes, 365; common, 10—2.

Asclepias physocarpa, Schltr. Kentani, valleys, 295; occasional, 11—1.

Asclepias Dregeana, Schltr. Kentani, hill-slopes, 656, and 655; occasional, 11—12.

Asclepias crispa, Berg. Near Black Rock Cove, grassy slopes, 279; common, 11—1.

Asclepias albens, Schltr. Near Black Rock Cove, grassy slopes, 654 and 652; common, 11—1.

Asclepias stellifera, Schltr. Qolora Station, prostrate along veld, 2089; 10.

Pachycarpus concolor, E. Mey. Kentani, grassy slopes, 644; occasional, 11—1; varied shades of brown.

Pachycarpus concolor, E. Mey. Near Qolora Station, 879; light yellow, only one plant seen, 12.

Pachycarpus linearis, N. E. Br. Kentani Hill, 1493; only two plants seen, 2.

Pentarrhinum insipidum, E. Mey. Kentani, edge of woods, 288; frequent, 11—12.

Cynanchum natalitium, Schltr. Black Rock Cove, prostrate on beach, 76; common, 7.

Cynanchum obtusifolium, Linn. f. Black Rock Cove, twining among scrub, 1294; common, 11—1.

Tylophora Flanaganii, Schltr. Kentani, in woods, 666; occasional, 12—1.

Tylophora syringaefolia, E. Mey. Kentani, in woods, 664 and 1275; rare, 10—1.

Sarcostemma viminale, R. Br. Black Pool and Kei Hills, 642; occasional, 12—1.

Marsdenia floribunda, N. E. Br. Kentani, in woods, 1195; rare, 12 (?).

Sisyranthus compactus, N. E. Br. Black Rock Cove, on grassy slopes, 658; frequent, 12.

Sisyranthus imberbis, Harv. Kentani, grassy slopes, 657; frequent.

Riocreuxia torulosa, Decne. Kobonqaba Drift, 877; rare, 12—1.

Riocreuxia Flanaganii, Schltr. Kentani, valleys, 214; occasional, 11—1.

Ceropegia tenuis, N. E. Br. In woods at Qolora Mouth, 665; occasional. 12—1.

Ceropegia Meyeri, Decne. Kentani, grassy slopes, 313; rare, 11—2.

(*To be continued*)

REVIEW

THE FLORA OF SOUTH AFRICA, WITH SYNOPTICAL TABLES OF THE GENERA OF THE HIGHER PLANTS. Vol. IV. By RUDOLF MARLOTH, Author of *Das Kapland*. With 42 coloured and 18 monochrome plates. *Cape Town: Darter Bros. & Co. London: William Wesley & Son.* 1915.

Some time ago there was a review in these pages of the first volume of this important addition to the literature of South African Flora. The present volume, second in order of publication but fourth in series, fully maintains the standard of the first. The coloured plates are of outstanding excellence in execution, and their subjects are skilfully chosen so as to be thoroughly representative. Perhaps even better are the photograph plates, telling as they do so much of the environment of the plants illustrated. Dr Marloth is happy in his combination of scientific insight, familiarity with the country, an eye for the picturesque and unusual photographic skill: to these he adds the power of taking immense pains to secure perfection. Could anything be more clear, for example, than Plates 37 and 60, showing the *Amaryllis belladonna* and the *Disa uniflora* at home? Only those who have tried to photograph such closely packed masses of vegetation know what depths of despair lurk therein.

The volume is complete in itself as giving the whole class of Monocotyledons; and since from a pictorial point of view this is perhaps the most attractive portion of our Flora, Dr Marloth is wise in having anticipated the order of publication. Let it not be a matter of surprise that in a scientific book so much prominence should be given to the pictorial aspect. This is part of the undertaking. Such sumptuous volumes could hardly be produced as a publisher's venture. They owe their existence to the union of two enthusiasms. Lady Phillips, animated by patriotic zeal and by love of the beautiful, desires to have the loveliness of the South African Flora worthily pourtrayed: Dr Marloth could not be expected to lay his hand to anything not scientific. One wants beauty without objecting to science: the other wants science, but rejoices to provide beauty as well. We have heard the criticism passed on the first volume, that for a scientific work it is a little too popular, and for a popular work it is a little too scientific.

Dr Marloth would probably accept the criticism, and we might well agree with him that in the present stage of botanical knowledge in South Africa that is exactly what we want. With the recent rapid spread of teaching in this subject, a class has arisen and is fast developing of persons intelligently interested without being highly trained. They are beyond sensational magazine articles on carnivorous orchids, but regard the *Flora Capensis* with an aloof and respectful admiration. Literature to encourage this class of persons is sadly lacking. Yet it is very important that they should be encouraged, not merely for the sake of the general intelligence of the country, but for the sake of the science itself. We can easily imagine the presence of this book in one of our country libraries by its sheer beauty and interest stimulating or even creating a zeal for local collecting which might well result in important scientific discoveries.

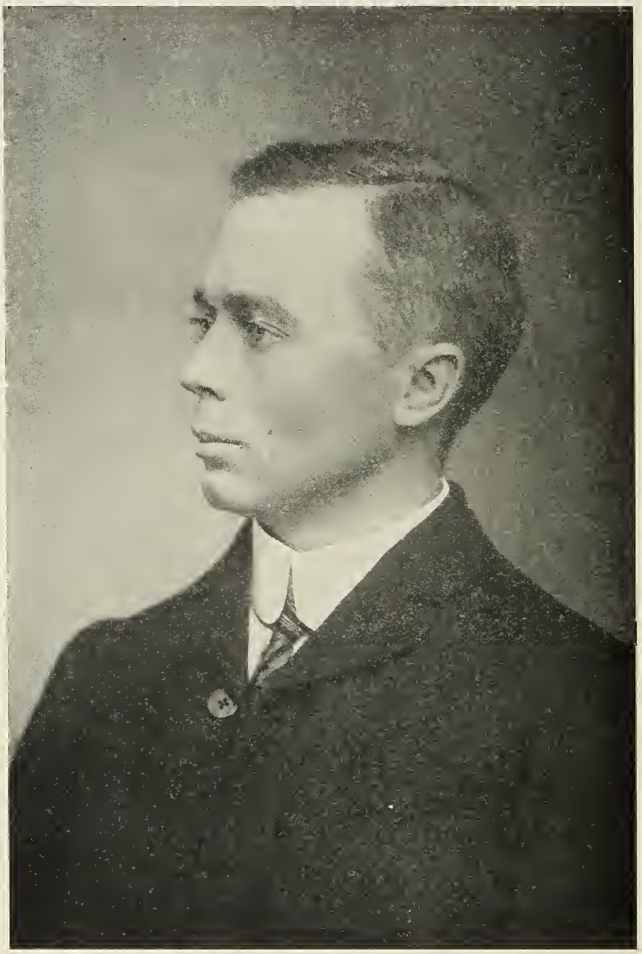
Dr Marloth in his annotations devotes himself mainly to ecology, and shows what a wide field is open to intelligent observation. His first volume has long been high in favour in Smith College, U.S.A., where it is regarded (so Professor Ganong writes) "as a perfect treasury of striking examples of plant-adaptation in which your flora is so rich." Among the author's original observations we may note the heliotropy (somewhat surprising in so substantial an inflorescence) in the spikes of *Aloe latifolia,* and the power retained by *Gladiolus cardinalis* of turning its flowers to the most convenient position for insects.

There are several charming discussions on the causes of floral brilliance and beauty of colour, e.g. in *Nerine sarniensis, Hypoxis stellata* var. *elegans, Moraea pavonia, Disa uniflora* and *Gladiolus cardinalis.*

But questions of structure are not neglected. Note, for example, the description of the remarkable growth of *Barbacenia* (hitherto called *Vellozia*), and of sections of leaves of *Gladiolus* spp.

It is perhaps a small point, but it is a great comfort to the youthful botanist, that the accents are marked on the generic names. Dr Marloth has also taken great pains over popular names, and his book will probably have great influence in fixing that somewhat shifting vocabulary.

F. C. Kolbe.



Phot. Elliott & Fry

H. H. W. Pearson (1870–1916)

H. H. W. PEARSON, F.R.S., Sc.D. (Cambridge)

By A. C. SEWARD,

Professor of Botany and Master of Downing College, Cambridge.

Harold Henry Welch Pearson was born at Long Sutton, Lincolnshire, on January 28, 1870, and died on November 3, 1916, at the Mount Royal Nursing Home, Claremont, Cape Town. He had been ill for several weeks and after recovering from the effects of an operation for hemorrhoids he contracted pneumonia which caused his death: it is suggested by the author of an Obituary Notice in the *South African College Magazine* that an attack of malaria in 1913 in Portuguese West Africa was the beginning of the undermining of his never very robust health. Pearson was educated privately: after holding a teaching post in a school at Eastbourne he obtained a Clothworkers' Exhibition and entered the University of Cambridge as a Non-Collegiate student in 1893. He obtained a First Class in both parts of the Natural Sciences Tripos (1896—97). In October 1896, after taking his Bachelor's degree, he entered Christ's College and was elected Scholar in the following June. In the same year he went to Ceylon with the assistance of a grant of £100 from the Cambridge University Worts Travelling Fund, the additional cost of the visit being generously defrayed, as Pearson states in his account of the Ceylon work, by his very good friend the Rev. Herbert Alston. In 1898, in consequence of his election to a Frank Smart Studentship, he became a member of Gonville and Caius College. He was appointed Assistant Curator of the Cambridge Herbarium in 1898, and in 1899 he was awarded the Walsingham Medal for his work on the vegetation of the Ceylon Patanas. He was appointed Assistant (for India) in the Herbarium of the Royal Gardens, Kew, in 1899 and two years later was transferred to the Director's office. In 1903 Pearson was elected to the Harry Bolus Professorship of Botany at the South African College, Cape Town, and took up his duties in April of that year. The relations between Dr Harry Bolus and the first occupant of the chair bearing his name were always most cordial. The confidence felt by the older man in the younger and expressed by many acts of kindness was repaid with the respect and affection which he received in return. In a biographical sketch of Dr Bolus Pearson described him as "a man who, one would think, almost unknown to himself, has played a great part in the establishment of Botany as a science in South Africa," a description that would also apply to the writer of these words. In 1915, under the editorship of Pearson, the Cambridge University Press published the First Part of the *Annals of the Bolus Herbarium*, a periodical devoted primarily to work inspired directly or indirectly by Dr Bolus and to investigations conducted in or in connection with the Bolus Herbarium. He was also editor of the *Journal of the Botanical Society of South Africa*, a Society of which he was one of the most active members.

Before leaving England Pearson married Ethel, the youngest daughter of the late William Pratt of Little Bradley, Suffolk. He took the Cambridge Sc.D. degree in 1907, and in 1916 was elected a Fellow of the Royal Society.

In the following sketch I have quoted freely from a series of letters in my possession in order to enable the reader to come into intimate relation with Pearson's singularly attractive personality. He combined the qualifications of the best type of student with the wisdom of the man of affairs; capable in organization, an original thinker, and a warm-hearted friend. He retained the enthusiasm and brightness of youth, and his uniform courtesy and tact made him popular with all who knew him. His influence as a botanist extended far beyond the ranks of his professional colleagues. It would be difficult to estimate at their true value the services he rendered to South Africa. He was a successful and stimulating teacher; his own keenness in research gave reality to his lectures, and through his influence several of his pupils came to Cambridge to continue investigations which he had suggested. He played a leading part in the foundation of the National Garden at Kirstenbosch which in the hands of competent successors should become one of the finest in the world.

My first meeting with Pearson was in 1892 at Eastbourne as a student attending a course of lectures on "Plant Life" which I was delivering as an University Extension Lecturer. During rambles on the shore in search of seaweeds he discussed with me the possibility of realising his ambition to come to Cambridge, and from that time onwards it was my privilege to enjoy his friendship. In a letter written on April 4, 1916, after hearing of his election to the Royal Society, Pearson recalled the Eastbourne days: "I was a little surprised to find myself in the list this year: that I was pleased needs no statement. Under any circumstances I should appreciate the honour immensely; under my particular circumstances I think I value it more than I should under some others—isolated here from the centre of the things that interest me, this distinction means a very great deal to me. I hope I deserve it. I am not quite sure though I am grateful to you and others for saying and thinking that I do....I regard this as an outcome of those...lectures you gave at Eastbourne—but for them where I should have been I do not know, but I certainly should not have been here, and almost certainly the Council of the Royal Society would never have heard of me."

Writing from Kew after his appointment to the South African chair he said: "I have always been fond of teaching. I even liked it when we made our 'Polysiphonia' excursions at Eastbourne. I have had very valuable experience here for which I believe I am the better. I certainly know more of systematic, economic, and administrative work than when I left Cambridge and if I have become a bit rusty in some of the other branches I think the defects will not be difficult to remedy." His subsequent career demonstrated the value of his early training. He was always thoughtful of others and expected those associated with him to do their share not only in teaching but in the investigation of the numerous problems awaiting solution. In a letter asking for the names of possible men for an assistantship he added, "He *must* do research work for which he will have as much time as I have."

At one time when the financial outlook in Cape Colony was far from bright and the College was compelled to reduce the Staff and the stipends of Professors, and because family affairs in England required attention, he seriously thought of returning to England. He was an applicant for the Botanical chair at Leeds: "My disappointment with regard to the Leeds post has been a thing of the past for some weeks....That they should insist on seeing a man before appointing him is obviously reasonable and were I on an appointment committee I should take the same line....As long as I am here I can at least do spade work in research." (July 30, 1907.)

Pearson's first published paper deals with the anatomy of the seedling of the Queensland Cycad Bowenia, a straightforward piece of work carried out in the Cambridge Laboratory and undertaken, as I well remember, with characteristic keenness. He was always specially interested in the Cycads and contributed many important additions to our knowledge of the South African representatives of the family, not only directly by his own observations in the field but by stimulating others more favourably situated geographically than he was for making regular records bearing on the phenomena connected with pollination, and by sending material to England. "I have to-day," he wrote on June 11, 1906, "got a little more light on the pollination question. One of my helpers, a lady living in the Native Territories, sends me a lot of notes she made on the growth of the male cone of *Encephalartos villosus* which are of great interest in this connection." She noticed a horrible smell when the sporophylls were open and caught several beetles. "Péringuey has identified the beast; he says it belongs to what is considered to be the most ancient group of the Coleoptera—which sounds fascinating but may of course mean nothing. Excuse this long scrawl. People here don't care much about these things and I must inflict them on somebody." In a later letter he spoke of evidence of insect-pollination in *Encephalartos Frederici-Guilielmi*: "the more I see of the wool-enveloped cones the more impossible it seems that it can be pollinated by any other agency. The cones are all infested by the same kind of weevil as that which inhabits *E. villosus.* The development part of the work is a tremendous business. It seems to me that I ought to go on fixing and section-cutting about 10 years before I write.... I returned last night from the Karroo and the Cycad country having had a very successful time. I had a most interesting three days with *Encephalartos Frederici-Guilielmi.* It is coning freely now and most cones when I was there were on the eve of pollination. As a result of a great number of observations I feel satisfied that in the case of a female plant cones are produced only once in six years and very frequently a longer period intervenes....As to coning it looks as if the process taxes the plant very severely so that it has to rest for some years before it can again attempt to produce cones.. The first seed-bearing plants surely cannot have taken it out of themselves to this extent or they could never have left any descendants. Then it must be that these Cycads are a long way from the earliest Spermaphyta and have developed on not very sound lines. One defect that suggests itself to me is that they produce far too many seeds for the size of the plant, for instance one of these *Encephalartos Frederici-Guilielmi* plants produces easily more than 1500 seeds in one season. When you think of the energy consumed in the rapid development of the cone...and the enormous quantity of carbohydrate stored away in the prothalli you cannot wonder that the plant feels a bit done up when all is over. Is there any evidence of the existence of *herbaceous* pteridosperms or gymnosperms in Mesozoic times? If there have ever been such Gymnosperms is it not strange that they have left no descendants of similar habit?...Yet the first vascular plants must have been herbaceous. What I have in my mind is the idea that the conditions which called forth the Cycads, for example, may have been entirely different from those at present prevailing and quite unsuitable for the existence of small perennials and annuals. Suppose for example a set of conditions which resulted in rapid and luxuriant growth. Then the Cycads of to-day might be the struggling posterity of a race of giants, preserving under adverse conditions the prolific reproduction of forbears which could afford such generous habits without endangering their existence thereby. But I must not worry you any more. These Cycads are most fascinating things and they grow upon one. In the Eastern provinces I am rapidly acquiring a reputation for incipient imbecility for I am told that there never before was anyone in South Africa who would spend 4 days in the train in order to spend 3 days among the Palms." Early in 1915 he wrote: "I do wish you could see my Cycads. The slope [in the National Garden] which, when you were here [July, 1914], harboured one specimen of *Encephalartos Altensteinii,* now holds 300 plants, representing possibly all the known and one hitherto unknown South African species." It was near to this slope that Pearson was buried on November 4, 1916.

Shortly after his arrival in Ceylon Pearson wrote: "I am at work on the patana flora up country. It is far more interesting on the spot than on paper. The patana looks very uninteresting from a distance as nothing shows but *Rhododendron arboreum* and a rough tussocky grass; but it really bears a fairly rich flora, composed almost entirely of xerophytic plants." Several attempts had been made to explain the occurrence of a comparatively barren country occupied by the savannah-like patanas, at approximately all altitudes over 2000 feet, in the midst of a luxuriant sub-tropical vegetation; but much more information was needed. At the suggestion of the Director of the Peradeniya Garden (Dr J. C. Willis), Pearson undertook the task of discovering the causes which led to the development of the flora. He concluded that the peculiarities of the climate have cooperated with periodically recurrent grass-fires in transforming an open forest into barren grassy plains. His results include an enumeration of the species collected, an account of their biological characters, and an interesting examination of the factors concerned in producing the xerophilous character of both the wet and dry patanas, that is the vegetation above and below 4500 feet. In the joint paper with his friend Mr J. Parkin the conclusions given in the first account, which were based on field observations, are tested by a thorough anatomical investigation. It was found that the peculiarities which usually characterise plants of insolated areas are not more strongly developed in members of the dry flora than in the plants of the wet patanas; a fact probably due to the influence of the powerful monsoon winds, the functional activities of the roots being also lowered by the humic acids in the soil. The Ceylon visit introduced Pearson to a new world which he thoroughly enjoyed, and by his apprenticeship to field-work in the wider sense he qualified himself for the later expeditions in South Africa which he conducted with conspicuous success.

A paper written at Kew deals with an enquiry, undertaken at the suggestion of Sir William Thiselton-Dyer, into the morphology and functions of the double pitchers of four species of Dischidia: this piece of work is exceedingly good considering that the material consisted entirely of herbarium material. He made full use of the time spent in the Herbarium to familiarise himself with the methods of systematic botany and as the list of his publications shows his output during that period was considerable. In later years he amply repaid the Royal Gardens by his gifts of material collected in South Africa. A collection sent to Kew was one of the finest series of succulents ever received in this country. The volume of the *Botanical Magazine* published in 1914 is dedicated to Professor Pearson, "as successful in his leadership of Botanical expeditions as he has been generous in distributing their fruits." The Botanic Garden of his old University has also greatly benefited by many contributions, and a word of acknowledgement is due to Mr Lynch, the able Curator, for the skill with which he cultivated Welwitschia and other plants received from Pearson.

Soon after his arrival at the Cape Pearson set himself the task of continuing the investigation of Welwitschia so splendidly inaugurated by Sir Joseph Hooker. In May, 1904, he wrote from Cape Town: "A year and a week since I arrived in the land of sunshine, dust, and politics and yet this is the first time I have set myself to write to you....I started last year with 11 students. This year I have 22....The Council is putting me up a splendid laboratory which I shall not be ashamed to show you when you come out.... I thought of you a good deal in January last when I spent two glorious days in the heart of the Damaraland desert in the company of the most magnificent array of flowering Welwitschias that ever man saw. You must know that when I was first appointed here I had a dream the purport of which was that Welwitschia was delivered into my hands. And sure enough without any particular effort on my part I found myself in Welwitschia-land and hoped to spend some weeks there. Fate, however, determined otherwise. The Hereros and the Germans came to blows and between the two of them I had a lively time of it. I was lodged in a German military station which I had to quit in haste. I hear that a few days only after I left the station ceased to exist." A second expedition was planned in 1906. He wrote in September of that year: "The Welwitschia trip is I hope fixed up. The Governor of the territory seems quite keen on my going again." In the same letter he made a suggestion which might with advantage be taken to heart by the Governing Bodies of Universities. "I am expecting to take my year's leave in 1908. Unfortunately I have to come on half-pay and shall have to economise. I must come however by some means as I am getting stale. They give us the sixth year off as a favour, on half-pay. I lose no opportunity of pointing out that in their own interests they ought not only to make it easier for us to take the leave but to insist that we do take it. I don't think one can stay here continuously for more than 5 years without deteriorating." In February, 1907, he wrote: "I and my collections landed this morning. I hope the trip has been entirely successful. Here I think I have established a record. The Swakop river-bed swarms with game and therefore the leopard is fairly common at Haikamchab—so common that the sergeant in charge of the station considered it quite unsafe to go out at night without arms—and indeed did not like me doing so during the day. So on two nights when I made expeditions to Welwitschia I was escorted by two men armed to the teeth and you may imagine me sitting on the sand in the moonlight with a bottle of chromacetic acid between my knees dissecting female cones while the two warriors stood at attention behind me....The German Government treated me with extraordinary kindness and generosity. They cabled instructions from Berlin to aid me as far as possible and this they certainly did....I have already told you they invited me to Windhuk." In the latter part of 1915 he was invited to the same place by General Botha and wrote on

January 11, 1916, from the Headquarters of the Union Forces: "I arrived here to-day after a rather arduous journey of five weeks duration through what is botanically an exceedingly interesting country. In the course of it I have seen what I have long wished to see, viz. the edge of the Welwitschia desert. In fact I have been able to trace the change in the flora from the Kalahari plateau right into the desert. Until my collections are worked out I cannot quite see whither I am being led, but I think I can now more or less co-ordinate many odd facts I have been accumulating in the course of these journeys and at least show the relation between the desert flora and those surrounding it....The work this time has meant a journey through some most difficult places. Both my waggons broke, though fortunately we were able to bring them both to the end of the 410 mile journey....On another occasion we had to travel all one night to reach the next water and in the course of it we crossed the same rocky river-bed no less than 20 times....However it is something to feel that one has been through it and has brought everything except 2 out of the team of 30 donkeys to the end of the journey....I asked one of the Bastard Hottentots who has now been under German government for years what he thought of the Germans. He said they are 'the worstest people under the sun'—and the Bastard has some reason for thinking so." In a letter to Prof. Herdman (published in *Nature*, March 2, 1916) written after his return to Cape Town, on January 28, Pearson referred to his journey through the semi-independent territory of the Bastard Hottentots, adding "No German dare venture into it, but when the people found I was English they could not do enough for me."

Perhaps the most interesting of the many results of his researches on Welwitschia is the discovery of the nature of the "endosperm." "I am now more than ever certain that the plant [Welwitschia] stands at the top of a series—I fear on a giddy pinnacle whose sides are so steep that there is no telling how it got there." In a later letter he says: "I am nearly converted to your view of the possible relationship between the Gnetaceae and Angiosperms. The Welwitschia endosperm has quite altered my point of view. I am going to try and prove that the Welwitschia endosperm is homologous with that of the Angiosperm and further that it belongs neither to the gametophyte nor sporophyte generation but is a structure *sui generis*....I must get hold of *Gnetum africanum*. If I can't get the money for the whole trip of which I have sent you an outline scheme...I hope I shall at least be able to obtain say £100 to enable me to go to Quetta where the Gnetum grows." A substantial grant from the Trustees of the Percy Sladen Memorial Fund enabled him to carry out the scheme in 1908—09.

In the earlier stages of development the embryo-sac of Welwitschia contains numerous free nuclei: this condition is followed by partial septation which produces a tissue of multinucleate compartments. In the upper part of the embryo-sac each "cell" has 1—2 nuclei and later as many as 5, while in the lower part of the sac each "cell" has 2—12 nuclei. The "cells" with 2—5 nuclei in the micropylar region of the embryo-sac produce embryo-sac tubes which grow up towards the descending pollen-tubes. On March 3, 1908, he discussed the question of nomenclature with regard to the "endosperm." "In Gnetum and Welwitschia the embryo-sac becomes filled with nuclei *all of which* are probably capable of being fertilised, i.e. all are potential gametes. Of these a few are functional. The remainder, or most of them, fuse in groups of 7, 8, 9, 10 or more and form a number of fusion-nuclei which I believe to be homologous with the definitive nucleus of the Angiosperm. These fusion-nuclei on division give rise to a tissue whose later growth is considerable and is so highly organised that the tissue (endosperm) must be regarded as an organism. This organism is not in the direct line of the life-cycle and belongs neither to the sporophyte nor to the gametophyte. Now as the term endosperm is physiological (according to its author's definition) and applies equally to the prothallus of Pines and to this endosperm of Welwitschia and the Angiosperm I want a morphological name for my new organism. I propose to call it the Trophophyte."

The Welwitschia work naturally led to an attack on Gnetum and one of the main objects of the Expedition of 1908—09 was to obtain material of *Gnetum africanum* from Angola. The first part of this journey was made in company with the Magnetic Survey Expedition of the Carnegie Institute under the leadership of his close friend and colleague Dr J. C. Beattie. On April 12, 1910, he wrote: "I have both *Gnetum africanum* and *G. scandens* on the go and I have cut about 10 ovules of each....While I am not yet able to prove it to the satisfaction of a sceptic I have myself no doubt that the endosperm [Gnetum] is formed as in Welwitschia (the attitude is I am afraid unscientific but it is I think impossible to keep one's mind open until the proof is complete)." In November, 1915, he added: "I have at last settled the question of the resemblance of the endosperm [of Gnetum] to that of Welwitschia; it is formed in exactly the same way, which pleases me mightily."

Prof. Pearson consented to contribute a volume on the Gnetales to the 'Cambridge Handbooks' edited by Mr Tansley and myself and this work may, we hope, be far enough advanced to be published. In a letter dated April 20, 1916, he wrote: "A large part of the book on the Gnetales is written though it will need some revision....As to the Gnetalean-Angiosperm alliance, there must be one I think, but at present I cannot bring myself to believe that it is direct. If they are not connected that endosperm wants a lot of explaining. The trouble is that I cannot yet make head or tail of the flower, and the relation between Ephedra and the others is extremely puzzling. The latter is probably very simple if we only had the key—the former I dream about, so far unsuccessfully. As to Bennettites I think I made far too much of the idea of a relationship in 1909 but I have not given it up yet. The more we know about the group the more difficult it seems to become." In a later letter he made an interesting suggestion about the comparison of the Gnetales and the Bennettitales. "I am bothered by my ignorance of Bennettites. I have never seen a section of a flower and the idea I have been harbouring for some time is very probably absurd. It is about that interseminal scale, the real nature of which, so far as I can make out, no one seems to understand. In my ignorance I have wondered whether it is really a 'scale' at all." He suggests that the interseminal scale "may be something of the nature of the thick cushion of Gnetum....If you have a large number of ovules arising in crowded whorls or spirals from an elongated conical axis, and sunk in the tissue of the axis as are the young ovules of *Gnetum africanum*, it seems to me that transverse and longitudinal sections might give very much the appearance of such sections of Bennettites."

Reference has already been made to Pearson's success as an explorer. The liberal grants from the Percy Sladen Memorial Trustees, who had complete confidence in his proposals, from the Royal Society, and from other sources led to results of exceptional importance—morphological, systematic, phytogeographical, and ecological. Pearson's success was due to his tactful persistence in the face of obstacles, his infectious enthusiasm, a sense of humour, his all-round training, and keen powers of observation.

Before the final arrangements for his most important expedition were complete, Pearson wrote: "On Saturday night I had a long talk with Dernburg in his bedroom at Government House. Did you ever discuss the situation with a European diplomatist in his bedroom? The [German] Imperial Government is most anxious that the country lying north of Windhuk...should be botanically examined with a view to its agricultural development.... I at once offered to go if the Government would organise the expedition and take me there and bring me back again. Dernburg accepted the offer on the spot. I asked for no remuneration and none was suggested." Two months later he added: "I am not quite sure but I believe that the Dernburg proposal is off." Shortly before leaving Cape Town Pearson wrote: "The Sladen Trustees have most kindly left me free to take either route from Windhuk. Unless the obstacles are serious I shall adhere to the Angola plan. Through Sir Donald Currie I have received a most cordial letter of introduction from the Portuguese Minister of Marine and the Colonies to the Governor-General of Angola. Furnished with this and with a formal letter from Sir Hely Hutchinson I am certain to receive every possible attention (probably to an embarrassing extent) and assistance from the authorities." He left Cape Town in November, 1908, and early in December reported progress from Calvinia...."I have just removed the stain of 12 days travel and had a more or less civilised breakfast. The first stage of the trip has been fairly arduous as we have crossed the N.E. corner of the Karroo which this year is nearly as arid as the German desert....I am sending nearly 300 species to Cape Town from here (you see I am in a fair way to become a real botanist and bundles of dried specimens are beginning to impress me greatly) —but seriously it is intensely interesting to follow the changes in the flora over a long-distance journey such as this." From Seeheim in German South-West Africa he complained of suffering from "another bout of hospitality which is if anything more killing than the English....I estimate that since I started I have collected about 1200 species, the majority of which are safely housed in Cape Town by this time....By the way I found living in a tent about 100 km. south of this place an old Irish lady who has a most vivid recollection of Galton whom she saw at Rehoboth when he visited this country in the fifties. She seemed quite confident that Galton will still remember her and begged me to give him a message from her. Her name is Mrs Bassingthwaite....The flies and the temperature are both fairly beyond words. I suppose this country is destined to become a colony some day but the native question must be solved first. I fancy that what is necessary is a thorough study of the subterranean water-courses throughout the whole of South Africa."

Pearson had many stories of amusing incidents on his journeys: one of his colleagues in the South African College writes: "It was a treat, for instance, to hear him tell in his unique way the story of the old storekeeper with whom he had stayed a couple of days and become friendly. This man had two sons and was obsessed with the necessity of fixing up their careers. He would like to consult the Professor. The elder was a really clever fellow, in his case there would be no difficulty, he naturally would go into business. But the trouble was the second. He was a very decent boy, but a bit dull, yes dull; he would be no good at business. It is good to recall the twinkle in Pearson's eyes and the laughter in his voice when he described the old man's trouble and the evident beating about the bush, and finally his blurting out quite seriously, Couldn't you tell me how to make him a Professor just like you."

The visit of the British Association to South Africa in 1905 was an event which gave great satisfaction to Pearson; he was justly proud of his Department and enjoyed showing it to his visitors. He played no small part in contributing to the success of the Meeting which is associated in my mind with memorable days spent with him and his wife in their Kenilworth home.

Of the many services rendered by Pearson to Science perhaps in some respects the part he played in the establishment of the National Botanic Garden[1] is the greatest. It is a splendid memorial of a botanist whose explorations enormously extended our knowledge of the richness of the floras of South Africa and who by his manifold activities and sound commonsense succeeded in demonstrating to the layman the value of botanical research. There can be no doubt that the credit for this addition to the efficiency of the Empire is mainly due to Pearson, though he would not admit that he was entitled to more than a comparatively small share in the events which led the Government to take the final step. The project was first put forward in a concrete form in his Presidential address before Section C of the South African Association for the Advancement of Science in 1910. He advocated concentrated action by the South African Colonies with a view to the full development of their unrivalled botanical resources and formulated a scheme worthy of a many-sided and far-sighted botanist. The Garden should be a centre of botanical activity in the widest sense; it should be concerned with botanical exploration, the cultivation of indigenous plants, and experimental work. He dwelt on the neglect of the native plants and stated that more South African species are cultivated in European gardens than at the Cape. The Garden should include a National Herbarium, a Museum of Economic Botany, a Library, and Research Laboratories. He emphasised the importance of grasping the fundamental truth that the true springs of South African development are within and not oversea. The Garden should also be an "expression of the intellectual and artistic aspirations of the new nation whose duty it is to foster the study of the country which it occupies, to encourage a proper appreciation of the rare and beautiful with which Nature has so lavishly endowed it." In an article on a 'State Botanic Garden' while advocating the importance of economic questions Pearson urged the importance of pure science: "problems which appear to be of merely academic interest to-day may be of unmeasured practical importance to-morrow.".

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[1] For a fuller account of the Garden and of the history of its inception and establishment the reader is referred to the *Kew Bulletin*, 1913, p. 309, and to the *Gardeners' Chronicle*, August 30, 1913, p. 151.

In reply to a request for a statement as to his share in the foundation of the Garden, Pearson wrote on March 13, 1914, "I do not really think I can say what has been my share in the formation of these gardens. I daresay they would not have been in existence just now but for my address to the South African Association in 1910. But since then a good many people have been prominent in the movement....Having been fairly constantly in the fray for three years I do not think I am well able to judge how much each of us contributed towards the result and I fear that I should be more likely to exaggerate the importance of my own efforts than those of anyone else." On April 16, 1912, he wrote: "I have got the Botanic Garden movement going strong just now. We have a deputation to the Prime Minister and he asks for a minutely detailed scheme. The site I have chosen (and which the Committee has approved) is a fine estate, 321 acres in extent, belonging to the Government (a part of the Rhodes estate) and now for many years derelict and unused. For the purpose of a Botanic Garden it could hardly be better suited."

On October 6, 1912, after referring to a projected expedition he adds: "I am longing to get away for a time from this teaching grind which is gradually wearing away my soul—this expression probably reflects but a passing mood. In any case the top of the Karasberg cannot but be delightful."

On May 27, 1913, he reported further progress with the Garden: "I sent you a paper containing an account of the Botanic Garden debate [in the House of Assembly]. Since then Sir Lionel Phillips has kept things going and to-day the end has been gained....The success is entirely due to Phillips—a man of extraordinary energy and enthusiasm....I am therefore to some extent identified with the scheme. A botanist must run it from the beginning if it is to be a success. At first it will be impossible to provide a salary for such a botanist. There is no other one who is in a position to take charge of it without payment. If I don't do it the South African Botanic Garden collapses for the time being. Circumstances are therefore too much for me and, though at no little personal sacrifice, I must undertake it. It will not entail my giving up my own line of work (at least it shall not) but it must interfere with it to some extent. But my own view is that if I can establish a Botanic Garden here on a sound basis I shall do more for Botany than by writing an extra paper or two. It may not be so good for myself, but that is, I hope, beside the point. I have been carried on almost involuntarily and have persuaded myself that I am acting rightly....Since I wrote to you the Council has given me a second Lecturer." In July of the same year he wrote: "As to the Directorship—there is at present no money available for a botanist and I can do the place a greater service by doing what little I can in an honorary capacity than if I became a salaried officer....I feel that the thing has come upon me unsought and I have no choice but to take it up. It will be a burden but it is worth carrying if it never falls to me to exploit its contents." The author of an appreciative and sympathetic article in the *South African College Magazine* in describing Pearson's work for the National Garden writes: "He never fully appreciated the value of his own enthusiasm and manner; and I remember the doubts which assailed him as the last attack—in a fight which he knew had been fought and lost many a time in the previous forty years—progressed and the unalloyed joy he experienced when at last he saw the Garden established."

Pearson was appointed Honorary Director and began his duties on August 1, 1913. The last time I saw him was on July 20, 1914. The Director's house was nearing completion and the plant-nurseries were well stocked with material received from various parts of the Dominion. From a wet glen in which were several plants of the South African Fern *Hemitelia capensis* we climbed up a rocky slope on the summit of which Aloes were flourishing in a habitat sharply contrasted with that below, and from a still higher point we looked across a forest of Silver trees (*Leucadendron argenteum*) and beyond to the shores of the Cape Peninsula, a view that it would be hard to match in any other Garden.

During his brief tenure of the Directorship he gave himself unsparingly to the work of construction, and the impression left on my mind after our tour of the Garden was that under his guidance Kirstenbosch would in course of time rival the best Gardens in the world. As the author of an Obituary Notice in the *Cape Argus* says: "He threw his whole soul" into the business of founding the National Garden and "carried out a work which will live for ever and which may be regarded as one of the treasures of South Africa." His burial place, to quote from the *Cape Times*, "faces the slope with the Cycad plantation, the one little section of his plans which in the short time vouchsafed him, he was able to bring near completion." The funeral service, in which the Archbishop of Cape Town took part, was held in the Protea church close to the Garden.

A few months after I saw Pearson in Cape Town he wrote to me about the condition of affairs in South Africa, showing his usual grasp of the political situation, and added: "Botha's action has been magnificent and has had a great effect. Even I have volunteered for any work they choose to put so useless a person to." And on April, 1915, "I have felt a little easier in my mind since I volunteered for local defence. I am now enrolled as a mounted infantryman, my official title being 'Trooper Pearson' which gives me some measure of satisfaction."

The range of subjects illuminated by Pearson's researches is shown by an inspection of the Bibliography. His contributions to the morphology and reproduction of the Gnetales have a special significance both from the point of view of their great interest to Botanists and as illustrating his skill as an investigator and his power of grappling with particularly difficult problems. As a systematist he held a high position: his earlier papers written at Kew deal with plants from many regions, and the fact that he was invited to describe the Verbenaceae and the Thymelaeaceae in the *Flora Capensis* and the *Flora of Tropical Africa* respectively show that his ability in this branch of the subject received due recognition. His later papers on systematic botany are concerned chiefly with the rich material collected by himself. Pearson gave special attention to the examination of the desert flora of South-West Africa particularly from the point of view of its relationship to the floras of neighbouring regions. One of his aims in visiting the Karasberg range, which rises from the level plateau of the Kalahari desert, was to search for clues to the past history of the South African flora. He always arranged his routes according to a well considered plan of attack upon the phytogeographical questions suggested by the different types of vegetation and the varied physical conditions of the countries through which he travelled. Had Pearson lived a few years longer there is no doubt he would have worked up his field-notes into a connected whole, and knowing how well qualified he was by training and by his ability to see things in their true perspective, one is able to realise to some extent how valuable such a digest of his knowledge and mature experience would have been. His thorough treatment of the problems presented by the root-parasite *Striga lutea,* a Scrophulariaceous plant locally known as the Rooibloem or Witchweed, which causes serious loss to cultivators of Maize, and the valuable practical directions for dealing with the disease afford further evidence of his versatility and of his desire to demonstrate the importance of botany as an applied science. With the assistance of Miss Stephens, one of his pupils, he studied the details of the haustorial structures and their connexion with the host; he also investigated the germination and dispersal of the small seeds and made many experimental trials of different methods of dealing with the pest. Previous attempts to germinate the seeds of Striga had been unsuccessful and Pearson proved that germination occurs only in presence of the host.

During a halt in Namaqualand Pearson made observations on the internal temperature of *Euphorbia virosa* and *Aloe dichotoma.* He found that Euphorbia, with its large chambered pith, responds more quickly than the Aloe to changes in the external temperature and attains higher maxima. He also investigated the effects of wounding: in Aloe the lowering of the internal temperature is due to evaporation at the surface of water conducted through the xylem, while in Euphorbia the lowering is due in part to surface-evaporation but also to the expansion of gases imprisoned in the pith.

In answer to a request for a few words about our friend the High Commissioner in London for British South Africa, the Rt. Hon. W. P. Schreiner, wrote as follows: "I don't think that I can really add anything that is not better said by others about dear Pearson. I entirely associate myself with what is written of him in prose and poetry in an article in the *South African College Magazine* for November, 1916, where he is placed at the front of the Roll of Honour. My abiding impression of him is of a shining bright personality. His laugh was a tonic. He was the most cheery man at cheerful gatherings such as our remote Oxford and Cambridge dinners on Boat Race night, or at the Annual College feasts at Cape Town. But his work and purpose were never lost sight of, and he won his way not only to our hearts but also to our pockets for the big object which he accomplished. He was a boy among men, but a greatly respected man among his boys and girls at College. By none more than by his friends and students in South Africa is his loss deplored."

Harold Pearson was a high-minded student and loyal citizen whose short life was spent in the service of Science and who laboured to the utmost of his capacity for the good of the country of his adoption. By his devotion to duty and his suppression of self in his dealings with all sorts and conditions of men, he gained not only the affection of those with whom he was associated but he exerted a very wide influence. His life recalls Hazlitt's words: "When the pursuit of truth has been the habitual study of any man's life, the love of truth will be his ruling passion." He enriched the world by deed and example; his pioneer work has made the path smooth for those who follow him, but it will be their responsibility and privilege to do their best to maintain the high standard represented by Pearson's work for Botany and for the common life of the Colony. As the writer of an In Memoriam article in *The Cape* truly says: "The best memorial that can be raised to him is to see that his work at Kirstenbosch is carried on, and the National Botanic Gardens made what he pictured them in his mind's eye. That is the way to perpetuate his memory, for as long as Kirstenbosch exists, there will be linked with it the name of its founder—the scholar and gentleman, Harold Pearson."

I cannot close this inadequate account of one of the most lovable men it has been my good fortune to know without a word of sympathetic reference to the devoted wife who shared his South African life. Though all botanists mourn the premature death of an able colleague and many are the poorer for the loss of a true friend, she whose loss is the greatest may derive some consolation from the knowledge that her husband's services were very widely and very sincerely appreciated.

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* For these titles I am indebted to the kindness of Mrs L. Bolus.

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POLLEN PRESENTATION IN *CRYPTOSTEMMA CALENDULACEUM*, R. BR.

BY S. GARSIDE, M.Sc.

(*With one plate.*)

CRYPTOSTEMMA CALENDULACEUM, R.Br., or *Arctotis calendulacea*, Willd., is a common South African plant, often found abundantly as a weed in cultivated areas, and popularly known as "gousblom."

On warm, sunny days, during September and October, large patches of plants bearing inflorescences, with their bright lemon-yellow coloured ray-florets, and greenish-brown disc-florets, may be seen.

In habit the plant varies considerably. In moist places and on cultivated lands, it is much branched and reaches a height of two feet; in arid places it is often almost stemless with a rosette of radical leaves and scape-like peduncles.

The disc-florets exhibit a very interesting mode of pollen-presentation, and also considerable sensitiveness of the style to contact stimulus, the response being a curving of the style in the direction from which the stimulus came. These phenomena have been described for closely related species by Minden[1], who described *Arctotis aspera*, Linn., but gave no figures, and by Small[2], who described the same species more completely and gave figures.

As both workers made their observations under the artificial conditions obtaining in the greenhouse, it was considered that some observations made upon a closely allied plant, growing under natural conditions in South Africa, would be of interest.

Pollen presentation in *Cryptostemma* does not appear to have been previously described, as Minden, though he refers to the sensitive styles of this plant, confines his detailed account to *Arctotis aspera*. There is a figure of the style of *Cryptostemma calendulaceum* in the account of the Compositae, by Hoffmann, in *Die naturlichen Pflanzenfamilien* (Engler and Prantl).

The *Cryptostemma* inflorescence consists of ray- and disc-florets.

The ray-florets are ligulate, bright lemon-yellow above, greenish-yellow below, and neuter. They are completely devoid of any trace of a style. The disc-florets are all perfect and all similar in structure. The tips of the five corolla lobes are thickened slightly and black in colour on their outer surfaces; within they are dull green. The disc-florets mature centripetally, and a well-grown inflorescence, in suitable weather, opens on three successive days. The inflorescence opens about 8.30 A.M., on a bright, warm day.

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[1] von Minden, 1901.

[2] Small, 1915.

Throughout the open period there is a well-marked heliotropic curvature of the peduncle, maintaining the surface of the inflorescence fully exposed to the sun's rays. If the inflorescence be a young one, open for the first time, the florets of the outermost ring open, exposing the tips of the staminal tubes, which can be seen projecting slightly (Fig. 1).

Then the process of pollen presentation commences. The tips of the anthers form five triangular flaps, which at first completely close the tube (Fig. 1). These are forced apart by the rapidly expanding style.

The style has a cylindrical, thickened, head, covered with minute spines formed by the conical epidermal cells with which it is covered (Fig. 5). These cells have a dark blue cell sap, rendering the style head almost black in colour. Round the base of the head these epidermal spines are comparatively long, forming a brush which effectively clears the spiny pollen grains from the staminal tube, when the style elongates (Fig. 2).

During pollen presentation, it is only the slender, stalk-like portion of the style that elongates, thrusting the head, thickly covered with yellow pollen, far out of the staminal tube.

The process of pollen presentation is remarkable for its rapidity, the complete elongation of the style occupying about five minutes under favourable conditions. On comparing young and completely extended styles, it is seen that the elongation is due to the rapid distention and elongation of the cells of the stalk portion of the style, no doubt due to the formation in them of osmotically active substances, followed by rapid absorption of water (Figs. 5 and 4).

The fully extended style is sensitive to contact stimulus, and will curve in the direction from which the stimulus comes (Fig. 3).

The cause of the movement is probably the sudden alteration in the permeability of the protoplasts of the style stalk, and a consequent loss of turgidity of the cells, owing to the excretion of water into the intercellular spaces with which the style is well provided. In order to produce curvature, the loss in turgidity must take place to a greater extent on one side of the stalk than upon the other.

Such a response is of considerable value in cross pollination, as is at once seen if a bee is observed during its visit to an inflorescence. The bee most frequently alights on the ray-florets, and walks to the centre of the inflorescence, turning round several times as it investigates the expanded disc-florets.

During the process, all the extended styles receive considerable blows, and at once curve towards the bee, leaving behind upon its hairy body a large proportion of their covering of pollen.

The bee, *Apis mellifica*, Linn., var. *caffra*, is the most frequent visitor, at least in the Stellenbosch district. Though other insects, chiefly Diptera and Lepidoptera, are occasionally seen on the inflorescences, on observing the proportionate number and movements of bees, it is obvious that they are the important insects in cross pollination. The completely effective manner in which bees remove the pollen is very noteworthy: as early as noon, those styles which elongated in the morning bear only a few scattered pollen grains, the style heads appearing black owing to the exposure of the dark coloured epidermal cells.

If inflorescences are protected from the visits of bees, the style heads remain loaded with pollen throughout the day, and also during the subsequent changes mentioned below.

Towards 4.30 P.M., in plants growing under natural conditions, the style stalk begins to contract, drawing the style head towards, and usually partly within, the staminal tube (Fig. 6).

In florets in which the style or the staminal tube has been slightly displaced, the bulky style head fails to enter the tube, and engaging with the stamen tips, pulls down the entire tube into the bell of the corolla. Owing to the continued contraction of the style, considerable curvature of the filaments is thus caused.

Such a condition is frequent after very windy days. Normally, however, the style contracts until only half the style head, or less, is projecting from the anther tube, in which condition it remains throughout the subsequent exposure of the stigmatic surface by the diverging of the very short style branches (Fig. 7). Before retraction is quite complete, the inflorescence closes, usually about 5 P.M., the ray-florets assuming a vertical position.

During the retraction of the style, in inflorescences protected from the visits of bees, the pollen is scraped off the style head by the top of the staminal tube, and collects in a mass upon the upper part of the style. This pollen would bring about self-pollination in the absence of insect visitors.

After all the florets of an inflorescence have opened (which may take two or three days, depending upon the size of the inflorescence and the weather experienced), the entire inflorescence droops and the ray-florets wither. The pendent position of the flower-head is maintained until the fruits are ripe, when the peduncle again straightens, the involucral bracts open, and the fruits, which are covered with tangled brown hairs, are dispersed by the wind.

Pollen presentation was also observed in *Arctotheca repens*, Wendl., a monotypic genus, frequently found growing along with *Cryptostemma*, and differing from it (in floral characters), in the absence of a pappus and of long, silky hairs covering the achenes.

The ray-florets are all neuter, as in *Cryptostemma*.

Arctotheca is quite similar to *Cryptostemma* in the method of pollen presentation, and the styles are also irritable. Indeed the only important difference observed between the two genera was that in *Arctotheca* the expanded styles are not so sensitive to touch as those of *Cryptostemma*. Plate IX.

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A NOTE ON "DOUBLING" IN *ERICA VENTRICOSA*, THUNB.

By R. GLOVER.

Specimens of *Erica ventricosa*, Thunb., found in the neighbourhood of French Hoek and sent to the late Dr Pearson by Dr de Villiers, shew the first case, which has come under our notice, of "doubling" in the genus *Erica*.

This is an example of Petaloidy, which according to W. C. Worsdell is the commonest form of "doubling" produced as a result of cultivation.

The drawings (Plate XIII A) shew the transition stages from stamens to petals. None of the stamens was perfect nor did any of the petaloid series shew either 4 or 8 parts but varied from 6 to 7 parts.

NOVITATES AFRICANAE

Empleurum fragrans, Glover (Rutaceae—Diosmeae), *E. serrulato*, Ait. affinis sed foliis minoribus ovato-ellipticis, segmentis calycis acuminatis longioribusque, loculis antherae apice convergentibus, carpello maturo multo minore distinguitur.

Fruticosum erectum glabrum, ramis virgatis pubescentibus, demum glabris; folia erecto-patentia alterna, petiolata, petiolis 0·5 cm. longis, ovata vel ovato-elliptica, supra plana pubescentia, infra carinata, carina pubescente, apiculata, integra vel minutissime crenulata, marginibus glandulis conspicuis donatis, ca. 0·5 cm. longa, 0·2 cm. lata; flores monoeci solitarii, axillares, pedicellati, pedicellis 0·15 cm. longis, bracteolatis; bracteis minutis, subulatis; calyx 4-partitus, segmentis oblongo-ovatis, acuminatis, ciliatis, dorso carinatis, 0·1 cm. longis, 0·05 cm. latis; petala 0; discus inconspicuus. Fl. ♂: stamina 4, calycis segmentis opposita, filamentis brevibus, linearibus, 0·2 cm. longis, 0·05 cm. latis, antheris magnis, atro-rubris, basifixis, in glandulam conicam acuminatam desinentibus, lateraliter dehiscentibus, 0·3 cm. longis; ovarii rudimentum sessile. Fl. ♀: carpellum unicum, excentricum, sessile, compressum, stylo laterali breviusculo tereti glabro, 0·15 cm. longo, stigmate simplici, maturum ovato-lanceolatum, rostratum, rostra recta, compressa, ca. 0·6 cm. longum, semine unico, testa nigra nitenteque.

Cape Province: South-Western Region; Swellendam Div., Grootvader's Bosch, fl. Sept. (Bolus Herbarium, No. 13325).

This species may be readily distinguished from the only other known species, *Empleurum serrulatum*, by its much smaller ovate-elliptical leaves, its acuminate and longer calyx segments, the cells of the anthers not diverging at the apex and not having the gland situated between them, and by the mature carpel being 3 to 4 times smaller.

Described from specimens received from P. J. Dormehl, Esq., to whom they were sent in a living state from the Grootvader's Bosch Forest in September, 1915. Plate X A.

E. latiflora, L. Bolus (§ *Hermes*), *E. axilliflorae* affinis, sed sepalis angustioribus longioribusque, corolla ore multo magis ampliata.

Erectus, ramis ad 40 cm. longis; ramuli cum pedicellis pubescentes, capillis patentibus vel reflexis, simplicibus; folia 4-nata erecta, incurva vel patentia, imbricata linearia acuta glabra, 0·5—1 cm. longa, 0·1 cm. lata, petiolo ad 0·2 cm. longo; flores pseudo-axillares, patentes vel nutantes; pedicelli 0·4—0·5 cm. longi; bracteae 3, duae supra medium, tertia minor, medio pedicelli positae, foliaceae lineares, 0·25—0·4 cm. longae; sepala lineari-subulata acuta, foliacea vel rubro-colorata, 0·4—0·5 cm. longa; corolla campanulato-obconica, breviter pubescens, saturate rosea, 0·8 cm. longa, 0·9 cm. diam., segmentis ovatis obtusis, 0·4 cm. longis; antherae inclusae subovatae, basi obliquae, decurrente denticulatae, 0·15 cm. longae, poro dimidium cellae excedente; stigma capitatum, manifestum vel brevissime exsertum; ovarium obconicum, infra glabrum, superne cano-villosum.

Cape Province: South-Western Region; ? Caledon Div. Bought fresh in Cape Town, Nov. 1906 (Bolus Herbarium, No. 14027).

Allied to *E. axilliflora*, Bartl., but differs in having longer and narrower sepals, and the corolla much more widened at the mouth. Plate X B.

E. Ethelae, L. Bolus (§ Evanthe), *E. glandulosae*, var. *β*. affinis, sed foliis 3-natis, corolla glabra, ore haud ampliata, antheris aristatis differt.

Fruticulus erectus, ramis 20 cm. longis, ad 0·2 cm. diam., pilosis, pilis patentibus vel reflexis, inaequilongis, longioribus simplicibus, ceteris obscure plumosis; folia 3-nata erecta, saepius internodiis aequilonga, linearia acuta sulcata glabra ciliolata, 0·2—0·5 cm. longa, 0·05—0·1 cm. lata; flores 3-nati, fere erecti vel cernui; pedicelli pilosi, pilis glanduliferis interjectis, 0·3 cm. longi; bracteae 3, duae approximatae, tertia subapproximata, 0·15 cm. longae; sepala erecta linearia acuta, apice carinata, glanduloso-ciliata, vix 0·3 cm. longa; corolla tubiformis, basin versus parum attenuata, faucibus vix contracta, glabra, 1—1·1 cm. longa, segmentis erectis rotundatis, 0·1 cm. longis; antherae subexsertae vel exsertae, lineari-oblongae, basi obliquae, obtusae, vix 0·2 cm. longae, aristatae, aristis cellae dimidio brevioribus, poro cellae dimidium aequante; stylus exsertus, stigmate capitellato; ovarium 4-loculare subglobosum glabrum.

Cape Province: South-Eastern Region; near Port Elizabeth, *Ethel West*, 295.

A very distinct species, nearest *E. glandulosa*, Thunb. var. *β*, *breviflora*, but differs in having 3-nate leaves, glabrous corolla not widened at the mouth, and aristate anthers. Plate X C.

E. dulcis, L. Bolus (§ Evanthe), *E. perspicuae* proxime accedit, sed corolla obconica breviore distinguitur.

Fruticulus erectus, ramis elongatis gracilibus, junioribus pilosis, pilis patentibus simplicibus; folia 4-nata adscendentia imbricata linearia subacuta, obscure sulcata, ciliata, juniora pilosa, 0·2 cm. longa, vix 0·05 cm. lata; flores solitarii adscendentes vel patentes; pedicelli glabri, 0·15 cm. longi; bracteae 3, subapproximatae lineari-lanceolatae, 0·2 cm. longae; sepala erecta ovata acuminata scariosa, apice foliacea, ciliolata, fere 0·3 cm. longa; corolla obconica pilosa, 0·9—1·3 cm. longa, segmentis erectis rotundatis, circa 0·2 cm. longis; antherae inclusae ovatae obtusae muticae, poro dimidio cellae aequilongo; stigma manifestum capitellatum; ovarium 8-loculare globosum glabrum.

Cape Province: South-Western Region; bought fresh in Cape Town, Oct., *H. Bolus*, 13407.

Like *E. perspicua*, Wendl., in every respect except that the corolla is obconic and shorter. Plate X D.

E. gallorum, L. Bolus (§ *Pleurocallis*), *E. longifoliae* affinis, sed foliis 5-natis, corolla obconica breviore differt.

Fruticulus robustus, ramis erectis vel adscendentibus, ad 45 cm. longis, 0·5 cm. diam., junioribus capillis simplicibus pubescentibus; folia 5-nata, dense imbricata, adscendentia incurvata, petiolo 0·2 cm. longo, linearia acuta plana, infra obscure sulcata, glabra, 1·4—1·6 cm. longa, 0·1 cm. lata; flores pseudo-axillares patentes, demum cernui; pedicelli pilosi, pilis patentibus brevissimis; bracteae foliaceae lineares, duae subapproximatae, tertia mediana, 0·45 cm. longae; sepala erecta subulato-linearia acuminata, 0·55 cm. longa; corolla obliqua obconica, ad 1·2 cm. longa, tubo papillato pilosoque, 12-nervato, infra medium satis abrupto dilatato, basi 0·3 cm., apice 0·9 cm. diam., segmentis patentibus, demum recurvatis, oblongis obtusissimis, irregulariter crenulatis, 0·4 cm. longis, sinubus rotundatis; stamina inclusa, filamentis fere strictis, antheris oblongis obtusis, basi obliquis, muticis, poro dimidio cellae aequilongo, saturate brunneis, 0·15 cm. longis; stigma manifestum vel exsertum, capitatum; ovarium 4-loculare subobconicum, profunde 8-lobatum, sericeo-villosum, basi glabrum, 0·25 cm. longum.

Cape Province: South-Western Region; French Hoek, fl. Oct. (Bolus Herbarium, No. 14029).

Closely allied to *E. longifolia*, Ait., but differs in having 5-nate leaves, and a shorter obconic corolla. Plate XI A.

E. excavata, L. Bolus (§ *Eurystegia*), *E. Grisbrookii* affinis, sed foliis 4-natis, pedicellis pilosis longioribus, floribus minoribus, corollae sinubus excavatis, antherae cristis angustioribus subintegris differt.

Fruticulus robustus, ramis erectis vel adscendentibus, circa 30 cm. longis, ad 0·3 cm. diam., junioribus pubescentibus capillis simplicibus; folia 4-nata erecto-adscendentia, imbricata vel internodiis subaequilonga, subulata attenuata glabra, saepe ciliata, obscure sulcata, 1—1·4 cm. longa, ad 0·25 cm. lata, petiolo 0·2 cm. longo; flores pseudo-axillares, patentes vel cernui; pedicelli apicem versus leviter incrassati, pilosi, pilis patentibus, 1·4—1·6 cm. longi; bracteae scariosae roseo-coloratae, duae parum supra, tertia parum infra medium positae, elliptico-oblongae, apice carinatae, 0·4—0·5 cm. longae; sepala erecta, anguste ovata, acuta carinata rosea, 0·7 cm. longa; corolla urceolata vel globoso-urceolata, obtuse 4-gona, glabra, 0·8—0·9 cm. longa, segmentis erectis rotundatis, 0·2 cm. longis, sinubus excavatis; stamina inclusa, antheris lineari-oblongis, basi obliquis, pubescentibus, pilis patentibus brevissimis, 0·2 cm. longis, cristatis, cristis acutis subintegris, poro dimidium cellae parum excedente; stigma demum exsertum subcapitatum; ovarium 4-loculare globoso-ovoideum glabrum.

Cape Province: ? Caledon Div.; obtained at the Wild Flower Show, Caledon, Sept. 1915. (Bolus Herbarium, No. 14028.)

Nearest *E. Grisbrookii*, Guth. and Bol., but differs in having 4-nate leaves, longer pilose pedicels, smaller flowers, sinuses of the corolla hollowed out, anther-crests narrower and subentire. Plate XI B.

E. Westii, L. Bolus (§ *Lamprotis*), *E. corifoliae* affinis sed pedicellis tomentosis, corolla puberula, antheris angustioribus differt.

Fruticulus erectus, ramis ad 22 cm. longis, 0·2 cm. diam.; ramuli pedicellique tomentosi; folia 3-nata erecta imbricata linearia acuta glabra, obscure sulcata, 0·8—1 cm. longa, 0·1 cm. lata; flores 3-nati, demum cernui; pedicelli 0·4—0·7 cm. longi; bracteae duae medianae lineares acuminatae, 0·3—0·4 cm. longae; sepala erecta, oblonga vel oblongo-ovata, acuminata, apicem versus carinata, roseo-colorata, 0·55—0·65 cm. longa; corolla suburceolata, faucibus vix contracta, puberula rosea, sepalis subaequilonga, segmentis erectis ovatis subobtusis, 0·15 cm. longis; antherae inclusae, basi obliquae, lineari-oblongae acuminatae, 0·15 cm. longae, cristatae, cristis incisis acuminatis, fere cellae aequilongis, poro dimidio cellae aequilongo vel ultra; stigma simplex; ovarium globosum glabrum.

Natal: Eastern Mountain Province; Drakensbergen, Cathkin Peak, alt. 6850—7100 ft., fl. Sep. 1912, *W. C. West* (S.A. Museum Herb., No. 4573); Giant's Castle, alt. 10,000 ft., fl. Oct., *J. Wylie* (J. M. Wood, 10555 partly).

Nearest *E. corifolia*, L., but differs in having tomentose pedicels, puberulous corolla and narrower anthers. Plate XI C.

E. Symonsii, L. Bolus (§ *Lamprotis*), *E. Westii* affinis, sed bracteis remotis, corollis glabris, antheris obtusis aristatis, basi ciliatis differt.

Fruticulus erectus, 27 cm. altus; ramuli pedicellique tomentosi; folia 3-nata erecta imbricata linearia acuta glabra, 0·8—1·2 cm. longa, ad 0·1 cm. lata; flores 3-nati, demum cernui; pedicelli 0·5 cm. longi; bracteae duae remotae oblongae, 0·2 cm. longae; sepala erecta elliptica, apicem versus carinata, roseo-colorata, 0·4 cm. longa; corolla suburceolata, faucibus vix contracta, glabra rosea, 0·45 cm. longa, segmentis erectis ovatis obtusis, 0·15 cm. longis; antherae inclusae, basi obliquae ciliatae, oblongae obtusae aristatae, aristis cellae dimidio aequilongis, poro cellae dimidio breviore; stigma simplex; ovarium globosum glabrum.

Natal: Eastern Mountain Province; Drakensbergen, Giant's Castle, alt. 10,000 ft., fl. Oct., *J. Wylie* (*J. M. Wood*, 10555 partly); alt. 9000 ft., fl. Sept. 1914, *R. E. Symons*, 9, 81.

Nearest *E. Westii*, L. Bolus, but distinguished by the remote bracts, glabrous corolla, and obtuse aristate anthers ciliate at base. Plate XI D.

Erica Cameronii, L. Bolus (§ *Dasyanthes*), *E. splendenti* affinis, sed foliis floribusque 3-natis, corolla ovoideo-urceolata, antheris muticis, ceterisque distinguitur.

Fruticulus humilis, ut videtur, ramis ad 12 cm. longis; folia erecta, dense imbricata vel erecto-patentia incurva, 3-nata, petiolata, petiolo 0·2 cm. longo, linearia obtusa, dorso sulcata, hispidula demum glabrescentia, 0·6—1 cm. longa, 0·15 cm. lata; flores 3-nati speciosi; pedicelli cum bracteis, sepalis, et corollis glanduloso-pubescentes atro-rubrique, 1·2—1·4 cm. longi; bracteolae oblongae subacutae, una medio pedicelli, duabus parum supra medium positis, 0·5—0·6 cm. longae; sepala bracteolis simillima, lanceolato-oblonga, 0·7 cm. longa; corolla ovoideo-urceolata, 2 cm. longa, segmentis erectis obtusissimis, 0·2 cm. longis; antherae inclusae vel manifestae, dorsifixae muticae, cellis apice parum divertigentibus, a latere visae oblongae, poro cellae dimidium excedente, 0·2 cm. longae; discus 8-dentatus; ovarium 4-loculare subglobosum glabrum, stylo demum exserto, stigmate simplici.

Cape Province: Worcester Div.; Fonteintjes Berg, 6500, fl. Dec. 1913, *K. Cameron*. (S.A. Museum Herbarium, No. 5110.)

Allied to *E. splendens*, Andr., but, besides other differences, is distinguished by its 3-nate leaves and flowers, ovoid-urceolate corolla and muticous anthers.

Described from two small branches with three well-developed flowers. Plate XI E.

E. elimensis, L. Bolus (§ Leptodendron), *E. condensatae* affinis, sed bracteis haud approximatis, pedicellis longioribus, floribus majoribus, corolla obconica differt.

Erectus, ramis ad 35 cm. longis; ramuli pubescentes, capillis simplicibus; folia 3-nata erecta, dense imbricata, linearia subacuta glabra ciliolata, 0·4—0·6 cm. longa; flores 1—3-nati, breves ramulos terminantes; pedicelli adscendentes, patentes vel recurvi, pubescentes, capillis simplicibus, 0·5—0·6 cm. longi; bracteae 3 foliaceae, duae infra medium positae, tertia major subbasalis, 0·2—0·4 cm. longae; sepala foliacea, rarius rubro-colorata, margine membranacea glanduloso-ciliata lanceolata acuminata, 0·3—0·4 cm. longa; corolla obconica glabra, saturate rosea, 0·6—0·7 cm. longa, apice 0·7 cm. diam., segmentis erectis rotundatis, 0·25 cm. longis, sinubus subrotundatis; stamina inclusa, filamentis fere strictis, 0·3—0·4 cm. longis, antheris fere medio filamento adnatis, oblongis obtusis scaberulis, 0·1 cm. longis, poro minore dimidio cellae; stigma capitatum, inclusum vel manifestum; ovarium globosum, glabrum.—*E. cruenta*, Soland., var. δ, *campanulata*, Bolus.

Cape Province: South-Western Region; Bredasdorp Div., dunes near Elim Mission Station, alt. 300 ft., fl. Oct. 1894, *H. Bolus*, 6378; (7 Caledon Div., Diep Gat, alt. 300 ft., fl. Oct. 1897, *E. E. Galpin*, 3650.

Allied to *E. condensata*, Benth., but differs in having remote bracts, longer pedicels, larger flowers, and an obconic corolla. Plate XII A.

E. Varderi, L. Bolus (§ *Ephebus*), *E. hirtae* affinis, sed indumento eglanduloso, sepalis latioribus, antheris fere medio filamento adnatis, aristis brevioribus, differt.

Erecta, circa 30 cm. alta; rami juniores pilis patentibus longioribus vestiti; folia 3-nata erecta incurva imbricata linearia obtusa, infra saepius late sulcata, scabrido-hirsuta, 0·5—0·6 cm. longa, petiolo 0·1 cm. longo; pedicelli patentes vel decurvi, hirsuti, 0·5—0·6 cm. longi; bracteae 3, subbasales, circa 0·1 cm. longae, infima minore; sepala ovata acuta, vix 0·15 cm. longa; corolla cyathiformis, faucibus vix vel leviter contracta, parce hispidula, 0·4—0·5 cm. longa, segmentis erectis vel patentibus subobtusis, 0·1 cm. longis; antherae inclusae oblongae, vix 0·1 cm. longae, aristatae, aristis ad basin cellae attingentibus, poro dimidium cellae aequante vel minus; stigma capitatum, inclusum vel manifestum; ovarium villosum.

Cape Province: South-Eastern Region; Howison's Poort, nr. Grahamstown, fl. Sep., *R. Varder* (Albany Museum Herbarium, No. 414).

Allied to *E. hirta*, Thunb., but differs in the indument not being glandular, the broader sepals, the anthers attached to the filament almost at the middle, and the shorter awns. Plate XII B.

E. Dykei, L. Bolus (§ Arsace), *E. salaci* affinis, sed bractea basali, corolla longiore, segmentis tubo multo brevioribus, antherae poro breviore, stigmate minore exserto differt.

Fruticulus humilis ramosus, ramis adscendentibus brevibus, ad 0·2 cm. diam., junioribus cum pedicellis brevissime pubescentibus, capillis patentibus simplicibus; folia 3-nata adscendentia imbricata linearia acuta glabra, obscure sulcata, 0·3—0·4 cm. longa, vix 0·1 cm. lata, petiolo 0·1 cm. longo; flores 3-nati, adscendentes vel patentes; pedicelli

0·25 cm. longi; bracteae 3, duae medianae, tertia major basalis, 0·1—0·2 cm. longae; sepala erecta oblonga subacuta, supra basin leviter constricta, apice carinata, ciliata, vix 0·2 cm. longa; corolla cyathiformis glabra, fere 0·3 cm. longa, segmentis erectis rotundatis, vix 0·1 cm. longis; antherae inclusae, anguste ovatae obtusae, basi obliquae dilute brunneae, poro cellae dimidio breviore, aristatae, aristis ciliolatis albidis, cellae dimidio longioribus; stigma exsertum capitatum; ovarium globosum glabrum.

Natal: Eastern Mountain Province; Drakensbergen, Mont-aux-Sources, alt. 10,000 ft., fl. April, *E. Dyke* (in Herb. Marloth, 5363).

Allied to *E. salax*, Salisb., but differs in having a basal bract, longer corolla, with the segments much shorter than the tube, shorter anther-pore, and smaller exserted stigma. Plate XII C.

E. Pearsoniana, L. Bolus (§ *Polycodon*), *E. rhodanthae* affinis, sed foliis longioribus, ramulis floriferis vix evolutis, pedicellis longioribus, antheris manifestis differt.

Fruticulus ramosus, ad 30 cm. altus; rami erecti vel adscendentes, juniores minute pubescentes capillis plumosis; folia 3-nata erecta imbricata petiolata, petiolo 0·1 cm. longo, linearia acuta, glabra vel ciliolata, inconspicue sulcata, 0·8—1 cm. longa, 0·1 cm. lata; flores 3-nati, patentes vel cernui, in ramulis axillaribus, valde abbreviatis dispositi, rosei; pedicellus minute floccoso-pubescens roseus, 0·5 cm. longus; bracteolae 3, 1 medio pedicelli vel parum infra, 2 supra medium positae, ovatae scariosae pallidae, 0·1 cm. longae; sepala bracteolis similia, sed suborbicularia, 0·15 cm. longa, fere 0·2 cm. lata; corolla cyathiformis, sulcis 4, sepalis oppositis, vix 0·3 cm. longa, limbo tubo subaequilongo, segmentis erectis obtusis; antherae manifestae dorsifixae semi-ovatae scaberulae atro-brunneae muticae, 0·1 cm. longae, poro dimidio cellae breviore; ovarium depresso-globosum, dense cano-pubescens, 4-loculare, 0·1 cm. diam., stigmate subcyathiformi, vix 0·05 cm. diam.

Cape Province: South-Western Region; Mossel Bay Div., *J. Muir*, 1303.

Allied to *E. rhodantha*, Guthrie and Bolus, but differs in having longer leaves, the flowering branchlets scarcely developed so that the 3-flowered tufts appear to be lateral, longer pedicels, and manifest anthers. In general appearance recalls *E. lavandulifolia*, Salisb. Plate XIII B.

E. arenaria, L. Bolus (§ *Arsace*), *E. salaci* affinis, corolla subcrateriformis, sed antheris late ovatis, stylo longe exserto, stigmate capitato, ovario hispido differt.

Fruticulus ramosus, circa 25 cm. altus; ramuli pedicellique tomentosi, capillis plumosis; folia 3-nata, patentia vel patenti-recurvata, lineari-oblonga obtusa crassa, obscure sulcata, 0·2—0·3 cm. longa; flores 3-nati, erecti vel patentes; pedicelli vix 0·2 cm. longi; bracteae 3, subapproximatae oblongae concavae, 0·1 cm. longae; sepala erecta scariosa ovata acuta carinata ciliata, 0·15 cm. longa; corolla subcrateriformis albida, vix 0·2 cm. longa, segmentis erectis rotundatis, tubo aequilongis; antherae inclusae, late ovatae, obtusae, 0·05 cm. longae, aristatae, aristis cella parum brevioribus, poro cellae dimidium aequante; stigma longe exsertum capitatum; ovarium depresso-globosum hispidum.

South-Western Region: Riversdale Div., Stille Bay, fl. May, *J. Muir*, 138; Hanglip, in Albertinia Duinen, fl. July, 1915, *id.* 2200; Zandhoogte, fl. May, 1909, *id.* 301 (*Herb. Galpin*, No. 5246).

Allied to *E. salax*, Salisb., but differs in having broadly ovate anthers, long-exserted style, capitate stigma, and hispid ovary.

Geissorhiza tulbaghensis, Bolus f., *G. Bellendenii* affinis sed caule pubescente, foliae vagina haud ventricosa, floribus solitariis perianthio superne albido, inferne sordide purpureo, differt.

Herba gracilis, 7—25 cm. alta. Cormus ovatus, 0·8—1 cm. longus, 0·5—0·6 cm. diam., tunicis e squamis planis imbricatis sature brunneis compositis; caulis saepissime flexuosus, rarius substrictus, teres, costatus, brevissime denseque pubescens, pilis patentibus, 3–4-foliatus, foliis 2—3 basalibus, sursum pedunculoideus, basi ad 0·2 cm. diam., pedunculis solitariis vel binatis, 1 fl., 2·5—8 cm. longis; folia erecta, interdum arcuata, linearia, acuminata, nervo medio prominente, lateralibus inconspicuis, glabra, ciliolata, basalibus ad orem vaginae in petiolum ad 4 cm. longum angustatis, 2—14·5 cm. longa, 0·1—0·35 cm. lata; spathae valva inferior oblongo-ovata, obtusa vel acuminata, tenuiter crebreque nervosa, basin versus herbacea, sursum membranacea, rubrobrunnea, 1—2 cm. longa, superiore 0·5—1·3 cm. longa; perianthii tubus strictus, infundibuliformis, basin versus cylindricus, sordide purpureus, 0·5 cm. longus, segmentis obovato-spathulatis, obtusis vel subacutis, albidis, basin versus sordide purpureis, 2—2·2 cm. longis, interioribus 0·7—1 cm. latis, exterioribus 1—1·4 cm. latis; stamina unilateralia, dimidium vel $\frac{3}{4}$ perianthii attingentia, filamentis purpureis, antheris versatilibus, linearibus, sature purpureis, 0·5 cm. longis; stylus demum stamina superans, ramis 0·4 cm. longis.

Cape Province: South Western Region; Tulbagh, near the village, alt. about 490 ft, fl. Oct., *L. Bolus* (Bolus Herbarium, No. 14851).

Allied to *G. Bellendenii*, MacOwan, but differing in having the stem pubescent, the leaf-sheaths not ventricose, and solitary flowers with the perianth whitish above and dull-purplish below.

This species together with *G. Bellendenii* and *G. rochensis* have unilateral stamens and approach *Tritonia*. The spathe-valves, however, and the tunics of the corm are those of a typical *Geissorhiza*.

Tritonia lilacina, Bolus f., *T. graminifoliae* accedit, sed distinguitur spathae valvis brevioribus, perianthii segmentis latioribus nec unguiculatis ceterisque.

Herba erecta, gracilis, ad 25 cm. alta, omnino glabra. Cormus ignotus. Caulis flexuosus, rarius substrictus, teres, sursum pedunculoideus, pedunculis simplicibus vel inferne 1-ramosis, 12—13·5 cm. longis, laxe 1—6-fl., floribus adscendentibus; folia basalia 3—6, suberecta vel subarcuata, linearia, acuta, plana, subcrassa, nervis 3, prominentibus, laminis 5—14 cm. longis, 0·1—0·2 cm. latis, folium caulinum unicum, ad 2 cm. longum; spathae valvae ovatae, obtusae, albidae vel pallide aurantiacae, ad apicem saturiores, exterior membranacea, crebre nervosa 2- vel 3-dentata, dentibus obtusis, sublatis, 0·7—0·9 cm. longa, 0·4—0·7 cm. lata, interior subhyalina, 2-dentata, dentibus acutis, nervis 2 tantum conspicuis, ceteris valde inconspicuis, exteriorem subaequans; perianthii tubus erectus vel suberectus, strictus vel parum curvatus, gracillimus, superne infundibuliformis, 1·8—2·8 cm. longus, 0·1 cm. diam. (circa medium), segmentis lineari-oblongis, obtusis vel subacutis, subaequalibus, pallide lilacino-roseis, delicatule nervatis, nervis saturioribus, 1·4—2·2 cm. longis, 0·45—0·8 cm. latis; stamina circa dimidium segmentorum attingentia, antheris versatilibus, linearibus, 0·4—0·55 cm. longis; stylus demum ± stamina superans, ramis ca. 0·4 cm. longis.

Cape Province: South-Western Region; exhibited at the Cape Town Wild Flower Show among plants sent from the Riversdale Div., Oct. 1914 (Bolus Herbarium, No. 13755).

Allied to *T. graminifolia*, Baker, according to the description, but may be distinguished by the shorter spathe-valves, broader and not unguiculate perianth-segments and by other characters.

Tritonia Flanaganii, Bolus f., *T. Nelsonii* affinis, sed spathae valvis omnino membranaceis longioribus, perianthii segmentis tubo brevioribus, summo ceteris distincte latiore differt.

Herba erecta, omnino glabra, 26—54 cm. alta. Cormus globosus, 1·3 cm. longus, 1·2 cm. diam., tunicis tenue fibrosis, areolatis, pallide brunneis; caulis substrictus, teres, nonnunquam basi foliorum vestigiis ± tenue fibrosis, ad 9 cm. longis circumdatus; folia basalia 3—6, erecta, substricta, plana, linearia, acuta, medio nervo subprominente, vaginis subcomplanatis, laminis 5—27·5 cm. longis, 0·2—0·3 cm. latis, folia caulina circa 4, lamina brevissima; spica secunda, simplex, axi subflexuoso, tereti, 3—7 cm. longa, 4—8-fl.; spathae valvae exteriores oblongae, obtusae, membranaceae, crebre nervosae, 0·7—1·1 cm. longae, 0·4—0·55 cm. latae, interiores ovatae, acutae, minute dentatis, subhyalinae, nervis mediis prominentibus, exterioribus parum breviores; perianthii tubus dimidio superiore infundibuliformis, substrictus, 1·1—1·75 cm. longus, segmentis oblongis, obtusis, roseo- vel atro-purpureis (in siccis), 0·8—1·2 cm. longis, 0·45—0·55 cm. latis, summo elliptico, circa 0·85 cm. lato, infimo 0·9 cm. longo, 0·4 cm. lato, inferioribus basi callosis, callo infimo multo majore, erecto, flavido; stamina apicem segmentorum fere attingentia, antheris versatilibus, linearibus, 0·5—0·7 cm. longis; stylus parum brevior staminibus, ramis circa 0·3 cm. longis.

Cape Province: South-Eastern Region; Komgha Div., grassy hills near Impetu between Komgha and Kei Mouth, alt. 500 ft., fl. Jan. 1891, *H. G. Flanagan*, 55. Kentani Div., flats near Kentani, alt. 1000 ft., fl. summer, 1903, *Alice Pegler*, 392.

Allied to *T. Nelsonii*, Baker, but differs in the entirely membranous longer spathe-valves, the perianth-segments shorter than the tube, the uppermost segments being distinctly broader than the others.

Watsonia albertiniensis, Glover, *W. aletroidi* affinis, sed perianthii faucibus infundibuliformibus, segmentis multo latioribus patentioribusque differt.

Herba glabra, 47—63 cm. alta; cormus circa 2·5 cm. diam.; caulis subteres, simplex vel ramosus; folia basalia 3—5, erecta linearia, acuta vel acuminata, 14—22 cm. longa, 1—1·5 cm. lata, caulina 2—3; rami floriferi 1—4; spica terminalis subsecunda, 19—30 cm. longa, 14—21-fl., floribus erecto-patentibus; spathae valvae exteriores obovatae, acutae vel acuminatae, apicem versus membranaceae, ad 2·3 cm. longae, 1·7 cm. lataeque, interiores ad 2 cm. longae; perianthium terra-cotta, tubo inferne gracili, circa 2·3 cm. longo, faucibus infundibuliformibus, 1—1·3 cm. longis, segmentis patentibus ovatis acutis, 1—1·2 cm. longis, 0·8—1 cm. latis; stamina 3, rudimentis 3 additis, faucum basi affixa.

Cape Province: South-Western Region; between Riversdale and Albertinia, *N. S. Pillans*, 1246; near Albertinia, fl. Oct., *J. Muir*.

Allied to *W. aletroides*, Ker, from which it may be distinguished by the funnel-shaped throat of the perianth and the broader and more spreading segments.

ON THE FLORA OF KENTANI

By A. PEGLER, A.L.S.

(*Continued from p.* 128.)

Loganiaceae

Gomphostigma scoparioides, Turcz. Kei River, 742; common, 11—2.

Nuxia floribunda, Benth. Manubi Forest, 1263; frequent, 7.

Chilianthus dysophyllus, A. DC. Kentani, in woods, 1154; common, 7.

Buddleia pulchella, N.E. Br. Kentani, in woods, 764; common, 7.

Strychnos Henningsii, Gilg. Kentani, in woods, 1277 and 1341; rare, 5.

Strychnos spinosa, Lam. Sand dunes above Black Rock Cove, 723; occasional, 10—12.

Gentianeae

Sebaea mirabilis, Gilg. Kentani, hill-slopes, 1187; rare, 3.

Sebaea filiformis, Schinz. Cat's Pass, grassy slopes, 1188; locally frequent, 3—4.

Sebaea ramosissima, Gilg. Veld near Kentani village and near Black Rock Cove, 490; common, 9—2.

Sebaea hymenosepala, Gilg. Kentani, valleys, 906; common, 12—2.

Exochaenium grande, Griseb. Black Rock Cove and Cebe Valley, 444 and 1453; occasional, 3—4.

Chironia baccifera, Linn. Among scrub at Black Rock Cove, 373; occasional, 12—2.

Chironia palustris, Burch. Near Qolora station in swampy ground, 305; occasional, 10—2.

Chironia Peglerae, Prain. Kentani, valleys, 428; occasional, 11—3.

Chironia laxa, Gilg. Gogwana Mouth, 1485; locally frequent, 12—1.

Limnanthemum Thunbergianum, Griseb. Kentani, in vleis, 797; occasional, 12—1.

Boragineae

Cordia caffra, Sond. Near Qolora Mouth, 810; occasional, 10.

Ehretia hottentotica, Burch. Hills near Qolora Station, 110; occasional, 7.

Cynoglossum enerve, Turcz. Kentani, valleys, 1797; occasional, 11.

Cynoglossum leptostachyum, DC. Kentani, valleys, 286; occasional, 5.

Lithospermum papillosum, Thunb. Cebe veld, 1365; locally frequent, 9—10.

CONVOLVULACEAE

Ipomoea simplex, Thunb. Veld slopes above Black Rock Cove, 522; locally frequent, 10.

Ipomoea biloba, Forsk. Black Rock Cove, prostrate on sea-beach, 323; common, 12—2.

Ipomoea purpurea, Roth. In scrub near Qolora Mouth, 818; seen once only, 10.

Ipomoea palmata, Forsk. In masses at Qolora Mouth, 720; common, 11—2.

Ipomoea crassipes, Hook. Prostrate among veld grasses, 2102; 11. White, with purple centre.

Convolvulus farinosus, Linn. Kentani, waste places, 344; frequent, 2.

Convolvulus arvensis, Linn. Kentani, waste places, 1398; frequent, 10—12.

Convolvulus natalensis, Bernh. Kentani, grassy slopes, 213; rare, 10—11.

Falkia repens, Linn. Grassy slopes margin Black Rock Cove, 721; locally frequent, 11—2.

Falkia dichondroides, Baker. Kentani, along roadside, 1210; common, 8—2.

Cuscuta natalensis, Baker. Kentani, margin of woods, 911; occasional, 4. Margin of woods at Fair View, 1508; locally frequent.

Cuscuta cassythoides, Nees. Kentani; parasite on all kinds of under-shrubs, 494; common, 4—5.

SOLANACEAE

Solanum nigrum, Linn. Kentani, chiefly in mealie-gardens, 479; universal, 4—6.

Solanum geniculatum, E. Mey. Scrub at Black Rock Cove, 1438; frequent, 5.

Solanum giganteum, Jacq. Kentani, along streams and in forest clearings, 709; frequent, 10—2.

Solanum aculeastrum, Dun. Kentani, near native kraals, 140; common, 8—2.

Solanum rigescens, Jacq. Kentani, in forest clearings, 146; frequent, 10—1.

Solanum sodomeum, var. Hermannii, Dunal. Kentani, waste places, 141; frequent, 10—1.

Solanum aculeatissimum, Jacq. Kentani, waste places, 142; common, 10—1.

Solanum duplosinuatum, Kl. Manubi Forest, 1267; occasional, 10.

Solanum capense, Linn. Near Black Rock Cove, 31; occasional, 7.

Physalis peruviana, Linn. Kentani, chiefly in mealie-lands, 397; occasional, 2—4.

Withania somnifera, Dun. Kentani, valleys, 407; frequent, 12—3.

Datura Stramonium, Linn. Kentani, waste places, 1848; common, 2—3.

SCROPHULARIACEAE

Diascia Aliciae, Hiern. Kentani, valleys and along streams, 401; frequent, 2—7.

Diascia rigescens, E. Mey. Near Black Rock Cove, 1439; occasional, 7.

Nemesia foetens, Vent. var. Near Black Rock Cove, 372; frequent, 6—7.

Diclis reptans, Benth. Kentani, among tall valley grasses, 131; frequent, 8—12.

Dermatobotrys Saundersii, Bolus. Saprophyte on forest trees, 1105; occasional, 6—7.

Halleria elliptica, Thunb. Kentani, in woods, 1; common, 7—9.

Anastrabe integerrima, E. Mey. Kentani, along streams, 369; frequent, 2. Said to cure Bright's disease.

Sutera polysepala, Hiern. Near Black Rock Cove, veld, 1350; frequent, 6—7.

Sutera racemosa, O. Ktze. Kentani, valleys in sheltered places, 896; occasional, 3.

Sutera Kraussiana, Hiern. Kentani, valleys in sheltered places, 492; rare, 4.

Phyllopodium cuneifolium, Benth. Black Rock Cove, 1309; locally frequent, 10—12.

Zaluzianskya capensis, Walp. On stony hill-slopes near Kentani village, and at Black Rock Cove, 406; frequent, 12—2. Flowers open about sunset.

Mimulus gracilis, R. Br. Vleis near Columba, 1399; 10—12.

Limosella grandiflora, Benth. Kentani, vleis, 327; common, 11—2.

Ilysanthes riparia, Rafin. Kentani, marshy ground, 1511; rare, 2.

Veronica Anagallis, Linn. Kentani, marshy ground, 1417; frequent, 12—2.

Veronica Tournefortii, Gmelin. Kentani, waste lands, 507; occasional, 5—6.

Melasma sessiliflorum, Hiern. Kentani, valleys where damp along margin of woods, 703; occesional, 2—3.

Striga Thunbergii, Benth. Kentani, among tall valley-grasses, 81; common, 9—10.

Striga lutea, Lour. Kentani, hill-slope among short grasses, 390; seen once only, 3.

Sopubia simplex, Hochst. Kentani, valley, 308; occasional, 4.

Bopusia scabra, Presl. Kentani, hill-slopes, re-growth after grass-fires, 102; frequent, 9—11.

Buchnera dura, Benth. Kentani, hill-slopes, 1416; occasional, 1—2.

Buchnera glabrata, Benth. Kentani, valleys, 319 and 1364; frequent, 10—11.

Cycnium adonense, E. Mey. Kentani, valleys, 1276; rare, 10—11.

Harveya coccinea, Schltr. Gogwana Mouth, 1415; rare, 11—12.

Harveya hyobanchoides, Schltr. Sand-dunes near Black Rock Cove, 46; occasional, 6.

Harveya speciosa, Bernh. Kentani, valleys after rains, 252; occasional, 11.

Hyobanche sanguinea, Linn. Sand-dunes near Black Rock Cove, 46; occasional, 6.

LENTIBULARIEAE

Utricularia stellaris, Linn. Vleis between Gogwana and Gxara Rivers at coast, 800; locally frequent, 11—1.

GESNERACEAE.

Streptocarpus Rexii, Lindl. Kentani, along sheltered streams in woods, 325; frequent, 11—2.

Streptocarpus parviflorus, Drège. In clefts of rocks near Qolora Mouth, 326; locally frequent, 11—2.

BIGNONIACEAE.

Tecomaria capensis, Spach. Kentani, valleys along streams, 134; frequent. 10—1.

ACANTHACEAE

Thunbergia atriplicifolia, E. Mey. Kentani, grassy slopes, 311; common, 12—2.

Thunbergia sp. Kentani, forest twiner, 191; rare, 12.

Ruellia ovata, Thunb. Cebe, and near Black Rock Cove, 171; frequent, 9—10.

Chaetacanthus glandulosus, Nees. Kentani, grassy slopes, 1147; common, 10—12.

Blepharis dilatata, C. B. Clarke. Kei Hills, 568; locally frequent, 12—2.

Sclerochiton Harveyanus, Nees. Kentani, in woods, 114; occasional, 1—2.

Crabbea nana, Nees. Kobouqaba Hills, 1461; occasional, 9—10.

Asystasia coromandeliana, Nees. Near Black Rock Cove, 2020; locally frequent, 12.

Barleria obtusa, Nees. Qora Valley, along roadside, 1189; locally frequent, 4.

Barleria Gueinzii, Sond. Qora Valley, along roadside, just on margin of Kentani and Willowvale boundary (Qora River between), 1190; locally frequent, 4.

Justicia Betonica, Linn. Kentani, sheltered streams, 466; common, 11—5.

Justicia campylostemon, Anders. Kentani, in woods, 340; frequent, 12—2.

Justicia Bolusii, C. B. Clarke. Kentani, sheltered streams. 374; frequent.

Siphonoglossa tubulosa, Lindau. Kentani, in woods, 177; frequent, 4—5.

Rhinacanthus communis, Nees. Valley Black Pool, in woods, 895; locally frequent, 2—3.

Isoglossa ciliata, Lindau. Black Pool Woods where clearing had been made 1834; locally frequent, 3.

Isoglossa delicatula, C. B. Clarke. Kentani, in woods where clearing has been made, 1837; occasional, 4—5.

Isoglossa Eckloniana, Lindau. Black Pool Woods, 1835, 1836; locally frequent, 3.

Isoglossa Bolusii, C. B. Clarke. Kentani, woods, 505; rare, 6.

Hypoestes antennifera, S. Moore. Kentani, valleys, 190; common, 4—5.

Hypoestes verticillaris, R. Br. Kentani, valleys, 367; common, 4—5.

Dicliptera zeylanica, Nees. Kentani, in woods, 912 and 1515; frequent, 4—5.

Dicliptera clinopodia, Nees. Kentani, outskirts of woods as undergrowth 822; common, 4—5.

SELAGINEAE

Hebenstreitia dentata, Linn. Kentani, rocky hill-slopes, 211; occasional, 11.

Hebenstreitia Watsonii, Rolfe. Grassy slopes above Black Rock Cove, 371 frequent, 11—1.

Selago hyssopifolia, E. Mey. Kentani, valleys, 423; common, 3.

VERBENACEAE

Lantana salvifolia, Jacq. Kentani, valley slopes, 699; frequent, 1—3.

Lippia asperifolia, Rich. Kentani, valleys and waste places, near homesteads, 330; common, 1—3.

Priva leptostachya, Juss. Kentani, damp sheltered places, 145; common 10—2.

Vitex mooiensis, Pearson. Kentani, tree on outskirts of wood, 1457; only one individual seen, 10.

Clerodendron glabrum, E. Mey. Kentani, in woods, 379; common, 11—1.

Clerodendron pilosum, Pearson. Kentani, sheltered hill-slopes, 164 and 1168; 11.

Avicennia officinalis, Linn. Swamps on Gatyana stream near coast, 2130. Collected by O. H. Miller (not in flower).

LABIATAE

Becium obovatum, N. E. Br. Kentani, grassy slopes, 75; occasional, 9—10.

Syncolostemon densiflorus, E. Mey. Kentani, hill-slopes, 386; common, 2—3.

Plectranthus calycinus, Benth. Kentani, along valleys, among tall grasses, 162; common, 2—3.

Plectranthus saccatus, Benth. Kentani, forest valleys, 162; frequent, 1—3.

Plectranthus ciliatus, E. Mey. Kentani, edge of woods, along streams, 352; occasional, 2—3.

Plectranthus laxiflorus, Benth. Kentani, marshy ground, 161; common, 11—4.

Plectranthus coloratus, E. Mey. Kentani, in woods, damp places, 907.

Plectranthus Ecklonii, Benth. Kentani, in woods, 376; common, 3—4.

Plectranthus Peglerae, T. Cooke. Kentani, in woods, 377; occasional, 3—4.

Plectranthus hirtus, Benth. Black Pool, 1516; occasional, 4—5.

Plectranthus tomentosus, Benth. Kentani, outskirts of woods where marshy, 488; frequent, 4—5.

Plectranthus Thunbergii, Benth. Kentani, damp, shady places along streams, 910; occasional, 4.

Plectranthus dolichopodus, Briq. var. Kentani, damp, shady places along streams, 909; occasional, 4.

Pycnostachys reticulata, Benth. Kentani, marshy places along streams, 417; common, 2—3.

Mentha longifolia, Huds. Kentani, along streams, 1157; occasional, 2—3.

Mentha aquatica, Linn. Kentani, marshy ground, 394; common, 2—4.

Salvia aurita, Linn. f. Kentani, diffuse masses where stream emerges from woods, 913; common, 3—4.

Salvia Peglerae, Skan. Kentani, valleys and along roadsides, 196; frequent, 10—2.

Stachys grandifolia, E. Mey. Kentani, edge of woods, 434; common, 3—4.

Stachys Cooperi, Skan. Kentani, in woods, 908; frequent, 3—4.

Stachys Galpinii, Briq. Kentani, among tall valley grasses, 187; common, 12—2.

Stachys aethiopica, var. glandulifera, Skan. Kentani, valleys and along roadsides, 231; 3—4.

Stachys caffra, E. Mey. Kentani, undershrub in woods, 422; frequent, 3—4.

Stachys sp. Kentani, decumbent round flat stones, on open hillside, 2017; locally frequent, 2.

Leucas martinicensis, R. Br. Kentani, as a weed in mealie-lands, 1755; frequent, 3—4.

Leonotis Leonurus, R. Br. Kentani, among tall valley-grasses, 368; common, 4—5; used as antidote for snake-bite.

Leonotis dysophylla, Benth. Kentani, among tall valley-grasses, 1514; occasional, 3—4.

Leonotis laxifolia, MacOwan. Kentani, usually in shelter of woods, 355; frequent, 3—4.

Teucrium riparium, Hochst. Kentani, valleys and along roadsides, 332; used in cases of anthrax; common, 12—2.

Ajuga Ophrydis, Burch. Kentani, veld and along roadsides, 318; common, 11—1.

PLANTAGINEAE

Plantago remota, Lam. Kentani, moist places, 1382; frequent, 10—11.

AMARANTACEAE

Celosia trigyna, Linn. In woods near Black Rock Cove, 884; occasional, 12.

Amaranthus paniculatus, Linn. Kentani, as a weed in mealie-lands, 729; frequent, 3—4.

Amaranthus retroflexus, Linn. Kentani, a garden weed, 1504; common, 3—4.

Cyathula globulifera, Moq. Kentani, valleys, but chiefly as a weed in mealie-lands, 731; 3—4.

Pupalia atropurpurea, Moq. Kentani, in woods, 272; rare, 3—4.

Achyranthes aspera, Linn. Kentani, in woods, near streams, 1499; common, 2—4. Dangerous emetic used by natives.

Achyropsis leptostachya, Hook. f. Kentani, valleys, 2059; occasional, 4—5.

Alternanthera Achyrantha, R. Br. Kentani, a weed, 2058; occasional.

CHENOPODIACEAE

Chenopodium murale, Linn. Kentani, a garden weed, 1373; common, 9—2.

Chenopodium Botrys, Linn. Kentani, a garden weed, 698; frequent, 2—3.

Chenopodium mucronatum, Thunb. Kentani, a garden weed, 1374; frequent, 9—2.

Exomis axyrioides, Fenzl. Kentani, near homesteads and roadways, 1406; occasional, 3—6. A proved cure for *Tinea tonsurans.*

Chenolea diffusa, Thunb. Trailing over rocks within reach of high tide near Mboqatawana, 1841; 6—7.

Salicornia fruticosa, L. In patches of mud and sand within tidal reach at Black Rock Cove, 648; 12—1.

PHYTOLACCACEAE

Phytolacca heptandra, Retz. Kentani, valleys among undergrowth, 744; occasional, 1—2.

POLYGONACEAE

Polygonum aviculare, Linn. Kentani, a garden weed, 1410; occasional, 11—12.

Polygonum serrulatum, Lag. Kentani, along streams, 402; frequent, 12—2.

Polygonum lapathifolium, sub-sp. maculatum, Dyer & Trim. Kentani, waste land where marshy, and in valleys, 258; frequent, 2—4.

Rumex nepalensis, Spreng. Kentani, marshy ground, 1407; occasional, 10—11.

Rumex sagittatus, Thunb. Kentani, valleys, 264; frequent, 2—3.

Rumex cordatus, Desf. Marshy places near Black Rock Cove, 725; occasional, 12—2.

Rumex Ecklonianus, Meisn. Kentani, marshy places, 1375; common, 10—11.

Emex Australis, Steinh. Kentani, a troublesome weed, 1248; common, 9—12.

CYTINACEAE

Cytinus dioicus, Juss. Near Columba, a parasite on *Berkheya seminivea*, edge of forest, 749; seen once only, 6.

PIPERACEAE

Peperomia reflexa, Dietr. Kentani, on rocks and decayed wood in woods, 1211; frequent, 6—7.

Peperomia retusa, Dietr. Kentani, trailing over rocks in woods, 763; occasional, 5—6. Damp woods, on stones, 1500; rare, 3.

MONIMIACEAE

Xymalos monospora, Baill. Kentani, in forests, 835; common, 7.

LAURINEAE

Cryptocarya Woodii, Engl. Kentani, usually along streams. 712; frequent, 10—2.

PROTEACEAE

Protea Flanaganii, Phillips. Kentani, hill-slopes, 274, 1871, 1872; occasional, 9—12.

Leucospermum attenuatum, R. Br. Hill-slopes near Black Rock Cove, 714; social, locally frequent, 10—12.

THYMELEAE

Dais cotinifolia, Harv. Kentani, in woods, 316; common, 12. Natives use strips of bark for binding reed mats.

Passerina filiformis, Linn. Along banks of Qolora about 3 miles from Silverstream, 1273; locally frequent, 10.

Passerina ericoides, Linn. Along beach at Black Rock Cove, 234; common, 12.

Gnidia Flanaganii, C. H. Wright. Grassy hills just above Black Rock Cove, 32; frequent, 10—12.

Gnidia nodiflora, Meisn. Kentani, veld, 1156; common, 7—9.

Gnidia ovalifolia, Meisn. Kentani, in woods, 166; occasional, 3.

Lasiosiphon anthylloides, Meisn. Kentani, grassy slopes, 333; common, 9—1.

Lasiosiphon triplinervis, Decne. Kentani, along streams, 48; common, 10—1.

Lasiosiphon Meisnerianus, Endl. Among short grasses on Kobonqaba Hills, 1246; 9.

Peddiea Africana, Harv. Kentani, in woods, 491; frequent, 7—8.

Englerodaphne leiosiphon, Gilg. Edge of woods near Columba, 175; common, 3—5.

LORANTHACEAE

Loranthus Dregei, E. & Z. Kentani, 418; universal, 2. Parasitic on any tree.

Loranthus Kraussianus, Meisn. Kentani, 292; occasional, 12—1. Parasitic on forest trees.

Loranthus quinquenervis, Hochst. Kentani, 1517; rare, 5. Parasitic on forest trees.

Viscum anceps, E. Mey. Kentani, 1813 and 1505; occasional, 4. Parasitic on forest trees. Fruit white.

Viscum sp. Kentani, 467; occasional, 5. Parasitic on forest trees. Fruit red.

SANTALACEAE

Thesium angulosum, DC. Kentani, grassy slopes, 176; frequent, 10.

Thesium junceum, Bernh. Kentani, veld, 878; frequent, 11—1. Grassy slopes above Black Rock Cove, 1302; common, 7—1.

Thesium sp. Kentani, grassy valley slopes, 2062; occasional, 12—1.

Osyridocarpus natalensis, A. DC. Kentani, in woods, 7—10.

BALANOPHOREAE

Sarcophyte sanguinea, Sparm. Kentani, 846; occasional, 11. Parasitic on roots of *Acacia Karroo.*

EUPHORBIACEAE

Euphorbia livida, E. Mey. Black Rock Cove, 1290; 11—1. Prostrate on sea beach.

Euphorbia striata, Thunb. Kentani, valleys, 1798; 9—10.

Euphorbia striata, Thunb. Near Columba, grassy slopes, 1393; common, 10—1.

Euphorbia epicyparissias, E. Mey., var. β, puberula. Kentani, valleys, 460; common, 10—1.

Euphorbia Kraussiana, Bernh., var. erubescens, N. E. Br. Kentani, woods 1200; frequent, 12—2.

Euphorbia mauritanica, Linn. Near Gxara River, 1129; rare, 4.

Euphorbia bupleurifolia, Jacq. Grassy slopes above Black Rock Cove and near Silverstream, 649; frequent, 12—1.

Euphorbia triangularis, Desf. Kentani, forests and bare hill-sides, 1419 A; common, 11—2.

Euphorbia triangularis, Desf. Kentani district, 1203.

Euphorbia grandidens, Haw. Near Kobonqubo, 1419 B.

Euphorbia grandidens, Haw. Near Columba, woods, 1518.

Euphorbia sp. Near Columba, forests, 1512; frequent.

Notobuxus natalensis, Oliv. Manubie Forest, 1258; locally frequent, 9—10.

Phyllanthus myrtaceus, Sond. Cebe, woods, 1119; frequent, 9—10.

Phyllanthus maderaspatensis, Linn. Kentani, valleys, 1139; frequent, 10. Grassy slopes, 1145; frequent, 10—11.

Phyllanthus Burchellii, Müll.-Arg. Kentani, valleys, 1165; occasional, 2. Sensitive to touch and shade.

Croton rivulare, Müll.-Arg. Kentani, woods, 174; frequent, 12—1.

Cluytia affinis, Sond. Kentani, outskirts of woods, 8; frequent, 8—9.

Cluytia pulchella, Linn. Kentani, outskirts of woods, 745; common, 3—4.

Cluytia alaternoides, Linn. Kentani, hill-slopes, 1250; locally frequent, 8—9.

Mercurialis annua, Linn. Above Black Rock Cove, woods, 875; locally frequent, 12—1.

Acalypha Ecklonii, Baill. Kentani, garden weed, 732; common, 4.

Acalypha peduncularis, E. Mey. Kentani, valley slopes, 65; common, 9—10.

Acalypha petiolaris, Krauss. Near Black Rock Cove, 870; common, 12—1.

Acalypha glabrata, Thunb., var. latifolia, Müll.-Arg. Near Black Rock Cove, in woods, 874; occasional, 12—1.

Acalypha glabrata, Thunb., var. pilosa, Pax. Kentani, valley, 606; 12.

Acalypha glabrata, Thunb., var. pilosior, (O.K.) Prain. Kentani, woods, 1198; rare, 10—12.

Ricinus communis, Linn. Kentani, valleys, on mealie-lands, 508; frequent, 6.

Adenocline acuta, Baill. Kentani, outskirts of woods, 495; common, 7—8.

Adenocline pauciflora, Turcz. Near Black Rock Cove, 871; common, 12—1.

Gelonium africanum, Müll.-Arg. Near Silverstream, Cebe and Manubie, 1120, 1259, 1260; common, 9—10.

Dalechampia capensis, Spreng. Kentani, outskirts of woods, 268; common, 11—1.

Tragia cordata. Kentani, outskirts of woods, 287; common, 11—1. Underside of leaf stings painfully.

Tragia rupestris, Sond. Kentani, among tall valley grasses, 186; common, 10—2. Stings painfully.

Tragia Meyeriana, Müll., var. hirsuta. Outskirts of Manubie Forest, 1257; occasional, 9—10.

Sapium Simii, O. K. Kentani, in woods, 897; frequent, 1—2. Cebe, forest, 1181; locally frequent, 9.

URTICACEAE

Celtis rhamnifolia, Presl. Kentani, forests, 834; occasional, 7—9. Forest tree.

Trema bracteolata, Blume. Near Qolora Mouth, 867; occasional, 1—2.

Chaetachme nitida, Planch. Kentani, woods, 724; frequent, 11—12.

Ficus caffra, Miq. Stony hills overlooking Qolora Mouth, 2117; 4. A scrambler.

Ficus capensis, Thunb. Kentani, woods, 1127; common, 9—12.

Ficus sp. Black Pool, woods, 762; occasional, 5.

Ficus craterostoma, Hutchinson. Black Pool, woods, 1762; occasional, 4. Kentani, woods, 1125; rare, 9.

Ficus sp. Kentani, woods, 1126; occasional, 9.

Ficus sp. Black Pool, woods, 1342; rare, 5.

Urtica Meyeri, Wedd., var. β, lobulata. Kentani, garden weed, 18; 10—2.

Fleurya capensis, Wedd. Kentani, shaded banks near streams, 696; common, 11—1.

Fleurya grossa, Wedd. Kentani, forest shelter, 634; occasional, 11—1.

Pouzolsia procridioides, Wedd. Kentani, forest shelter, 733; occasional, 11—1.

Australina acuminata, Wedd. Kentani, garden weed, 1383; common, 10—12.

MYRICACEAE

Myrica aethiopica, Linn. Kentani, along streams, 883; locally frequent, 2.

SALICINAE

Salix capensis, Thunb. Occurs along the Kei River, but I have not collected it.

CONIFERAE

Podocarpus latifolius, R. Br.

Podocarpus elongatus. Timber-trees, frequent as re-growth: not collected by me.

CYCADACEAE

Encephalartos Altensteinii, Lehm. Black Pool in woods, 1116; frequent, 1. Cones appear in Jan. ♂ mature in April—May, ♀ in Dec.

Encephalartos villosus, Lehm. Kentani, in woods, 342; common, 1.

Encephalartos sp. Grassy slopes near Columba, 1124; occasional.

Stangeria Katzeri, Regel. Grassy slopes near Silverstream, common near Black Rock Cove, 262; 1. I have never found a cone near Silverstream.

Stangeria paradoxa, Moore. Manubie Forest, 1247; common, 10.

ORCHIDEAE

Megaclinium Sandersonii, Oliver. Epiphyte on forest trees, Cebe and Manubie, 888; common, 11—12.

Eulophia nutans, Sond. Kentani, valleys, 290; rare, 11.

Eulophia hians, Spreng. Kentani, among *Bobartia Burchellii* on hill-side, 370; rare, 1.

Eulophia sp. Kentani, hill-slopes, 781; 9.

Eulophia ensata, Lindl. Kentani, among tall valley grasses, 301; occasional, 12—1.

Eulophia inaequalis, Schltr. Kentani, grassy hill-side, 841; rare, 9.

Eulophia Peglerae, Rolfe. Herb. Bolus, No. 10677.

Eulophia foliosa, Bolus. Kentani, short veld grass, 204; frequent, 11.

Eulophia streptopetala, Lindl. Kentani, in forest shelter, 232; occasional, 11.

Eulophia speciosa, Bolus. Among scrub at Black Rock Cove, 782; common, 10—12.

Polystachya Sandersonii, Harv. Kentani, on forest trees, 203; occasional, 11.

Polystachya Ottoniana, Reichb. f. Kentani, on forest trees, 617; rare, 11.

Polystachya pubescens, Reichb. f. Kentani, on forest trees, 619; rare, 11.

Angraecum Mystacidii, Reichb. f. Kentani, on forest trees, 471; frequent, 2.

Angraecum pusillum, Lindl. Kentani, on forest trees, 42; occasional, 6.

Angraecum bicaudatum, Lindl. Kentani, on forest trees, 1864 and 1466; occasional, 12.

Listrostachys arcuata, Reichb. f. Kentani, on forest trees, 293; occasional, 12. Seems to be getting later. Last season it blossomed in Feb.

Mystacidium Peglerae, Bolus. Kentani, on forest trees, 993; occasional, 2.

Mystacidium pusillum, Harv. Kentani, on forest trees, 885; occasional, 6.

Mystacidium Aliciae, Bolus. Kentani, on forest trees, 886; rare, 2.

Mystacidium gracile, Harv. Kentani, on forest trees, 779; occasional, 6.

Mystacidium capense, Bolus. Kentani, on forest trees, 294 and 1496; occasional, 12.

Brachycorythis ovata, Lindl. Kentani, valley-veld, 271; rare, 10. Violet-scented.

Stenoglottis fimbriata, Lindl. Kentani, on rocks in forest shade, 275; occasional, 4.

Habenaria foliosa, Reichb. f. Veld above Black Rock Cove, 864; occasional, 12—1.

Habenaria laevigata, Lindl. Kentani, grassy slopes, 92; occasional, 10.

Habenaria tridens, Lindl. Kentani, along streams, 346; frequent, 2.

Habenaria falcicornis, Bolus. Kentani, hill-slopes, 347; common, 2.

Habenaria Dregeana, Lindl. Kentani, hill-slopes, 348 and 1814; formerly quite common, 2.

Habenaria Macowaniana, Kränzl. Kentani, grassy slopes, 349; formerly quite common, 2.

Habenaria cassidea, Reichb. f. Kentani, in shady wood, 780; occasional, 8.

Habenaria Bonatea, Reichb. f. Veld above Black Rock Cove, 299; occasional, 12.

Habenaria Bonatea, Reichb. f., var. Boltonii, Bolus. Shady scrub at Black Rock Cove, 1435; common, 6—7.

Satyrium Woodii, Schltr. Kentani, valleys, among tall grasses, 242; locally frequent, 11.

Satyrium longicauda, Lindl. Kentani, grassy slopes, 257; formerly in great patches, now rare, 9—11.

Satyrium marginatum, Bolus. Kentani, grassy slopes, 88; frequent, 9.

Satyrium Hallackii, Bolus. Kentani, marshy ground, 1817: one individual only seen, 11.

Satyrium sphaerocarpum, Lindl. Kentani, grassy slopes, 298; occasional, 2.

Satyrium macrophyllum, Lindl. Kentani, valley slopes, 395; formerly common, 2.

Disa polygonoides, Lindl. Kentani, in marshy ground on veld, 437; occasional, 3.

Disa Macowanii, Reichb. f. Kentani, marshy places on veld, 206; frequent, 11.

Disa crassicornis, Lindl. Kentani, among tall valley grasses, 315; frequent, 11.

Brownleea parviflora, Harv. Kentani, among tall valley grasses, 2056; one individual only seen, 3.

Brownleea coerulea, Harv. Kentani, stream bank under forest shelter, 820; rare, 3.

Pterygodium hastatum, Bolus. Kentani, among tall valley grasses, 1183; rare, 4.

Pterygodium nigrescens, Schltr. Kentani, valley, 241; (one individual only seen), 11.

Disperis micrantha, Lindl. Kentani, on stones in forest shade, 799; rare, 4.

Disperis disaeformis, Schltr. Kentani, veld, under shelter of tall grasses and scrub, 1784; in numbers one season only, 6.

Disperis Woodii, Bolus. Sand-dunes near Qolora Mouth, 41; frequent, 6. "Furthest westerly station recorded" (Bolus).

SCITAMINEAE

Strelitzia reginae, Banks. Sand-dunes near Black Rock Cove, where it is common; rare near Kentani village.

Strelitzia angusta, Thunb. In great clusters near Qolora Mouth, 1132; common, 7—10.

HAEMODORACEAE

Sansevieria sp. Although frequent I have not seen this in flower; in leaves and habit it seems like *S. thyrsiflora*, Thunb.

IRIDEAE

Moraea spathacea, Ker. Kentani, depression in village commonage, 1445; locally frequent, 4.

Moraea spathacea, var. β, natalensis, Baker. Kentani, valleys, among tall grasses, 427; frequent, 11—1.

Moraea spathacea, var. γ, Galpinii, Baker. Qolora River, banks, 1206; locally frequent, 7—8.

Moraea edulis, Ker. Kentani, veld, 1114; common, 7—10.

Moraea iridioides, Linn. Kentani, valley-streams, 484; common, 10—12. This makes a lovely show as a number of the flowers burst into bloom simultaneously.

Moraea iridioides, Linn., var. β, prolongata. Kentani, forests, 1163; common.

Moraea bicolor, Spae. This affects the larger streams, Kobonqaba and Qolora, 23; occasional, 10—12.

Bobartia Burchellii, Baker. Kentani, social, occupying large patches of veld, 816; common, 10.

Aristea anceps, Eckl. Kentani, veld, damp places, 1283; occasional, 1.

Aristea schizolaena, Harv. Kentani, along streams, 354; occasional, 2.

Aristea Ecklonii, Baker. Kentani, along streams, 193; frequent, 10. Above Black Rock Cove, marshy ground, 717; locally frequent, 12—1. Near Black Rock Cove, grassy slopes, 2077; occasional, 12—1.

Hesperantha pulchra, Baker. Kentani, damp valleys, 450; frequent, 11—12. Opens only in morning sunshine.

Dierama pendula, Baker. Kentani, grassy slopes, 91; common, 9—11.

Dierama pulcherrima, Baker. Kentani, valley-slopes, 784; always rare, this lovely flower is now never seen here, 12.

Lapeyrousia cruenta, Baker. Kentani, in forest shade near streams, 858; frequent, 11—12.

Watsonia angusta, Ker. Kentani, grassy slopes, 387; common, 3—5. Sub-social.

Tritonia rosea, Klatt. Kentani, banks of stream, 266; rare, 12.

Tritonia lineata, Ker. Kentani, valleys and damp places, 85; common, 9—10.

Tritonia Flanaganii, Bolus f. Kentani, veld, 392; frequent, 1—2.

Crocosmia aurea, Planch. Kentani, in forest shade near streams, 339; frequent, 2.

Acidanthera brevicollis, Baker. Black Rock Cove, on beach, 817; frequent, 10—12. Perianth dull lilac, giving an impression of being faded.

Gladiolus tristis, Linn. Kentani, grassy veld, 66; frequent, 9—10. Opens towards sunset, sweet scent.

Gladiolus ochroleucus, Baker. Above Black Pool, grassy slope, 824; rare, 5.

Gladiolus Ecklonii, Lehm. Kentani, veld, slopes, 737; common, 2—3.

Gladiolus oppositiflorus, Herb. Kentani, hills, 250; rare, 11.

Gladiolus sp., near G. Macowanii, Baker. Near Black Rock Cove, 719; locally frequent, 12—1.

Gladiolus Tysonii, Baker. Kentani, damp valleys, 256; occasional, 11—12.

Gladiolus permeabilis, Delaroche. Kentani, hill-slopes, 103; frequent, 10—11. Associated with *Bobartia Burchellii.*

Antholyza aethiopica, Linn. Near Black Rock Cove, marshy ground, 500; locally frequent, 6—7.

Antholyza sp. Near Black Rock Cove, marshy ground, 881; locally frequent, 12—1.

AMARYLLIDEAE

Hypoxis membranacea, Baker. Kentani, banks of streams and among tall valley-grasses, 109; common, 10—2.

Hypoxis villosa, Linn. Kentani, grassy veld where damp, 108; locally frequent, 10.

Hypoxis villosa, Linn., var. Kentani, valleys near streams, 690; frequent, 10.

Hypoxis rigidula, Baker. Kentani, hill-slopes, 1286; frequent, 11—12.

Hypoxis Rooperi, Moore. Kentani, grassy slopes, 1143; occasional, 10—11.

Hypoxis Rooperi, Moore, var. β, Forbesii, Baker. Kentani, grassy slopes, 1142; frequent, 10—11.

Hypoxis argentea, Harv. Kentani, damp places on veld, 689; common.

Anoiganthus breviflorus, Baker, var. β, minor. Kentani, usually after grass fires, 29; frequent, 7.

Crinum longifolium, Thunb. Black Pool, along stream under forest shelter, 336; 2.

Brunsvigia Josephinae, Gawl. Kentani, slopes, 398; frequent, 2. Leaves appear in Sept. and remain green until Dec. or Jan.

Nerine undulata, Herb. Towards Kobonqaba Mouth, 814; locally frequent, 7—10.

Cyrtanthus obliquus, Ait. Above Black Rock Cove, veld, 632; frequent, 10—1.

Cyrtanthus angustifolius, Ait. Kentani, about 8 days after grass-burning, when it appears in numbers *without* leaves, 27; common, 6—8.

Cyrtanthus lutescens, Herb. Kentani, along streams, 28; common, 7—8.

Cyrtanthus sanguineus, Hook. Stony hill overlooking Qolora Mouth, 2116 and 391; 4.

Clivia miniata, Regel. Along Kei River and Willowvale side of Qora (so assume Kentani Dist.) and Kei Hills, 1264 and 2104; locally frequent, 10.

Haemanthus Katherinae, Baker. Kentani, along streams, in forest shelter, 441; occasional, 2.

Haemanthus magnificus, Herb. Kentani, along streams, 188; common, 9—11.

Haemanthus albiflos, Jacq. Among scrub at Black Rock Cove, 852; 7.

Buphane longipedicellata, Pax. Kentani, hill-slopes, 218; frequent, 10. (Leaves fan-shaped arrangement.)

DIOSCOREACEAE

Dioscorea malifolia, Baker. Kentani, forests, 1812 and 739; occasional, 11—12.

Dioscorea diversifolia, Griseb. Kentani, valleys, twining round grasses, 263; common, 11—12.

Dioscorea Dregeana, Baker. Kentani, forests, 469; common, 11—12. (Dies off in May.)

Dioscorea Tysonii, Baker. Above Black Rock Cove in woods, 794; occasional, 11—12.

LILIACEAE

Asparagus virgatus, Baker. Kobonqaba River, 1462; frequent, 9.

Asparagus plumosus, Baker. Kentani, in woods, 345; common, 10.

Asparagus Cooperi, Baker. Kobonqaba Hills, 1463; occasional, 9.

Asparagus stipulaceus, Lam. Kobonqaba Hills, 1451; occasional, 7.

Asparagus africanus, Lam. Kentani, hill-slopes, 9; frequent.

Asparagus falcatus, Linn. Kentani, in forests, 1335; frequent, 2.

Asparagus aethiopicus, Linn. Bordering beach at Black Rock Cove, 1482; common, 12—1.

Asparagus medeoloides, Thunb. Kentani, along streams, 1240; common, 8—9.

Asparagus aethiopicus, Linn., var. natalensis, Baker. Kentani, in woods, clambering 6 ft. or more, 840; occasional, 7.

Asparagus subulatus, Thunb. Kentani, hill-slopes among stones, 2078; occasional, 10.

Behnia reticulata, Didr. Kentani, in woods, 777; common, 8—9.

Dracaena Hookeriana, Koch. Kentani, in woods, 905; common, 12—1.

Kniphofia modesta, Baker. Kentani, among tall valley-grasses, 851; rare, 11.

Kniphofia sarmentosa, Kunth. Kentani, marshy ground, 838; frequent, 7—8.

Gasteria excelsa, Baker. Qolora hill-side overlooking river, 1293; locally frequent, 1—2.

Aloe micracantha, Haw. Kentani, among tall grasses, 2127; 1.

Aloe Boylei, Baker. Kentani, veld, 1135; occasional, 11—12.

Aloe saponaria, Haw., var. lineata, Schön. Kobonqaba Hills, 1200; frequent, 6—7.

Aloe tenuior, Haw. Near Columba, skirting forest, 138; occasional, 10—11.

Aloe ciliaris, Haw. Qolora Mouth, on hill-side, 1426; locally frequent, 6—7.

Aloe ciliaris, var. Tidmarshii, Schön. Qora River (Willowvale side), 1170; locally frequent.

Aloe ferox, Miller. Kobonqaba Hills, 1201; "slightly different from type," Schön. Common, 6—7.

Bulbine asphodeloides, Roem. Kentani, valley marshes, 1243; common, 9—10.

Bulbine latifolia, R. & S. Kentani, valleys, 1204; occasional, 9—10.

Bowiea volubilis, Harv. Seen edge of forest just below Residency only, 454; rare, 12—2.

Eriospermum natalense, Baker. Kentani valley, plants locally frequent, but flowers seen once only, 1807; 12.

Anthericum pubescens, Baker, var.? Sandy slopes above Black Rock Cove, 1349; locally frequent, 6—7.

Anthericum Gerrardii, Baker. Kentani, valleys, 1379; occasional, 11.

Chlorophytum Bowkeri, Baker. Kentani, hill-slopes among tall grasses, 1172; frequent, 1—2.

Chlorophytum elatum, R. Br., var. β, Burchellii, Baker. Kentani, in forest shade, 1171; 1—2.

Agapanthus umbellatus, L'Hérit. Kentani, along streams, 630; common, 12. Kentani, hill-side, among tall grasses, 363; common, 2. (Plant taller, flower smaller and darker than 630.)

Tulbaghia alliacea, Linn., var. Ludwigiana, Harv. Kentani, valleys (when far from water honey-scented, when along stream strongly alliaceous, but colour unchanged), 403; common, 11—2.

Tulbaghia violacea, Linn., var. obtusa, Baker. Marshy bank of Gogwana at coast (wild garlic), 276; locally frequent, 12.

Thuranthos macrantha, C. H. Wright. Kentani, valleys. Leaf appears in Feb., dies off about June, 79; formerly finer and more frequent, 11.

Drimia elata, Jacq. Near Qolora Mouth, on grassy slope, 1440; occasional, 6—7.

Dipcadi viride, Moench. Kentani, valleys, 1381; rare, 10—11.

Albuca fastigiata, Dryand. Kentani, valleys among tall grasses, 1330; frequent, 11.

Eucomis punctata, L'Hérit. Kentani, along marshy valleys, 320; common, 12.

Scilla rigidifolia, Kunth. Kentani, grassy slopes, 362; occasional, 11.

Scilla natalensis, Planch. Kentani, veld, 850; locally frequent, 10.

Scilla ovatifolia, Baker. Kentani, valleys, 297; occasional, 12.

Scilla polyantha, Baker. Kentani, valleys along streams, 1140; common, 10.

Scilla sp. nr. S. linearifolia, Baker. Kentani, hill-slopes, 1395; occasional, 11.

Scilla Baurii, Baker. Near Black Rock Cove, 1141; common, 9—10.

Ornithogalum lacteum, Jacq. Kentani, along streams and marshy places, 219; common, 8—12.

Ornithogalum flavovirens, Baker. Kentani, valleys, 1396; rare, 11.

Ornithogalum Ecklonii, Schlecht.? Kentani, valleys and Black Rock Cove, 1380 and 2018; locally frequent, 11.

Ornithogalum caudatum, Ait. Black Pool Valley, 1464; locally frequent, 9—10.

Ornithogalum capillare, Wood & Evans. Kentani, round flat stones in shallow earth on hill-side, 1182; locally frequent, 4.

Ornithogalum comptum, Baker. Grassy veld above Black Rock Cove, 837.

Gloriosa virescens, Lindb. In scrub at Black Rock Cove, 300; common, 12—2.

Sandersonia aurantiaca, Hook. Near Manubie Forest, 577; 10.

Littonia modesta, Hook. Kentani, edge of forests, once frequent, now rare, 291; 12.

COMMELINACEAE

Commelina Livingstonei, C.B.Cl. Just above Black Rock Cove, fugitive and very frail, 1319; common, 11—12.

Commelina africana, L. Just above Black Rock Cove and Kentani, among grasses, Kunth, 1320 and 2091; 11—12.

Commelina Eckloniana, Kunth. Kentani, usually in waste places, 2092; 11.

Aneilema aequinoctiale, Kunth. Near Kobonqaba Mouth, damp sheltered places, 815; locally frequent, 10.

Cyanotis nodiflora, Kunth. Kentani, veld, 1149; common, 11—12.

FLAGELLARIEAE

Flagellaria guineensis, Sch. Near Gogwana Mouth, 831; frequent, 1. (First leaves of young plant have no tendrils.)

JUNCACEAE

Juncus exsertus, Buchen. Kentani, marshes and along streams, 202; frequent, 3.

Juncus Dregeanus, Kunth. Qolora station, marsh, 2093; common.

Juncus capensis, Thunb. Kentani, marshes and along streams, 1107; frequent, 6.

Juncus punctorius, Linn. f. Kentani, marshy ground, 2086; locally frequent, 10.

Juncus lomatophyllus, Spreng. Kentani, marshy ground, 1103; common, 4.

Juncus lomatophyllus, Spreng. Near Black Rock Cove in marsh (much larger than 1103), 1035; 12.

Prionum palmita, E. Mey. Vlei near Mbogtwana, 2021; 12.

Palmae

Phoenix reclinata, Jacq. Crowning sand-dunes at Black Rock Cove and along coast streams, and near Silverstream, 801; common, 12—1.

Typhaceae

Typha australis, Schum. & Thom. Kentani, marshy ground near stream, 1164; frequent, 2.

Aroideae

Zantedeschia africana, Engl. Usually in marshy ground, along streams (at the coast this is sweet-scented), 159; 9—2.

Zantedeschia albomaculata, Hook. Kentani, valleys, 261; common, 11—1.

Naiadaceae

Triglochin laxiflorum, Guss. Qolora Mouth, 1497 and 353; common, 12—1.

Aponogeton spathaceum, Hook. Kentani, wayside vlei, 1869; rare, 11—12. Qolora stream, about 5 miles from mouth of river, 2063; seen once, 12.

Potamogeton pusillum, L. Kentani, submerged in deep fresh-water pool, 2042; 12.

Potamogeton sp. Submerged, Gxara River Mouth, 438; 3.

Zostera marina, Linn. Washed ashore at Gxara River Mouth, 16; 12.

Restiaceae

Thamnochortus fruticosus, Berg. Just below Black Rock Cove, among veld grasses, subsocial, 791; common, 7.

Cyperaceae

Kyllinga erecta, Schumach. Kentani, valley, among coarse grasses, 1490; 1. Near Black Rock Cove, veld, moist places among grasses, 1480; 1.

Kyllinga melanosperma, Nees. Kentani, marsh and streams, 240; 3.

Pycreus flavescens, Reichb. Kentani, marsh, 1089; 3.

Pycreus polystachyus, Beauv. Kentani, Black Pool, 350; 12.

Pycreus umbrosus, Nees. Kentani, veld, damp places, 150; occasional, 2; valley, marsh, 1136; rare, 10.

Juncellus laevigatus, C.B.Cl. Black Rock Cove, on beach in sea water, 1494; 1.

Cyperus rupestris, Kunth. Kentani, hill-side, 1185; occasional, 3.

Cyperus pulcher, Thunb. Kentani, marsh, 1083; 3.

Cyperus denudatus, Linn. f. Kentani, marsh, 1082; 3.

Cyperus textilis, Thunb. Kentani, along streams, 1152; 11.

Cyperus distans, Linn. f. Kentani, waste damp land, 1086; 3.

Cyperus immensus, C. B. Cl. Kentani, along streams, 1180; 2. Sharp-cutting blade: our largest sedge.

Mariscus Dregeanus, Kunth. Coast, marshy ground, 1304; frequent, 12. White head.

Mariscus Sieberianus, Nees. Kentani, waste land, 1088; 3.

Mariscus umbilensis, C. B. Cl. Kentani, valley, marshy ground, 1282; common.

Fimbristylis diphylla, Vahl. Kentani, among veld-grass, 1090; common, 3.

Fimbristylis complanata, Link. Kentani, marsh, 1087; 3.

Fimbristylis monostachya, Hassk. Kentani, veld, 1096; 3.

Bulbostylis humilis, Kunth. Kentani, hill-side, flat stones, 1186; occasional, 3.

Scirpus diabolicus, Steud. Coast, marshy ground, 1303; 12.

Scirpus cernuus, Vahl. Kentani, along streams, 1101; common, 5. Very fine and brittle.

Scirpus rivularis, Boeck. Kentani, along streams, 1102; 5.

Scirpus prolifer, Rottb. Kentani, marshy bank, 356; frequent, 2.

Scirpus paludicola, Kunth. Kentani, marsh and stream, 200; 3.

Fuirena pachyrhiza, Ridley. Kentani, marshes and streams, 309; frequent, 2.

Fuirena Ecklonii, Nees. Kentani, marshes, 341; occasional, 11.

Scleria melanomphala, Kunth. Kentani, damp spots, 322; 3.

Scleria sp. Kentani, among tall valley grasses, 1498; 2.

Schoenoxiphium sparteum, Kuk. Kentani, valley along forest-clearing, damp soil, 1196. Sheltered places, banks of streams, 1098; 3.

Schoenoxiphium sp. Kentani, forest, edge of stream, 1097; 4.

Carex phacota, Spreng. Kentani, along streams, 1150; 11.

Carex clavata, Thunb. Kentani, in marshy places, 151; 10.

Imperata arundinacea, Cyr. Columba Valley, near Kobonqubo, 1390; 11.

Erianthus capensis, Nees. Kentani, valleys, growing in masses, excellent thatch, 393; common, 3.

Erianthus Sorghum, Nees. Kentani, along streams, 1093; occasional, 3.

Pollinia villosa, Spreng. Kentani, veld, 68; occasional, 11.

Trachypogon polymorphus, Hack., var. capensis, Hack. Kentani, veld, 1307; common, 1.

Elionurus argenteus, Nees. Kentani, among coarse valley grasses, 1386; 11.

Andropogon appendiculatus, Nees. Kentani, valleys, 82; occasional, 11.

Andropogon amplectens, Nees. Kentani, veld, 1056; frequent, 2.

Cymbopogon marginatus (Steud.), Stapf, var. prolixus, Stapf. Kentani, valleys, in masses, 1091; common, 3.

Cymbopogon excavatus (Hochst.), Stapf. Kentani, valleys, 396; common, 3.

Cymbopogon hirtus (Linn.), Stapf. Kentani, veld, 1099; occasional, 4.

Heteropogon contortus, R. & S. Black Rock Cove, veld, 2088; common, 10.

Anthistiria imberbis, Retz. Kentani, veld, 115; common, 10.

Paspalum scrobiculatum, Linn. Kentani, veld, particularly along paths, 245; frequent, 2.

Paspalum dilatatum, Poir. Kentani, waste places, introduced, 2044; 3.

Digitaria eriantha, Steud. Kentani, valleys, 1092; 3.

Digitaria eriantha, Steud., var. stolonifera, Stapf. Kentani, veld, 2049; 4.

Digitaria ternata, Stapf. Kentani, along roadways, 2043; locally frequent, 3.

Digitaria sanguinalis, Scop. Kentani, mealie-lands, 2015; 4: waste land, 1058; 2.

Panicum stagninum, Koenig. Kentani, coast, introduced, 283; 12.

Panicum perlaxum, Stapf. Kentani, valleys and plains, 207; 11.

Panicum maximum, Jacq. Kentani, along streams and in lands, 237; 2.

Panicum proliferum, Lam., var. longijubatum, Stapf. Kentani, mealie-lands, 248; 2.

Panicum proliferum, Lam., var. paludosum, Stapf. Kentani, bordering mealie lands, 2060; 5.

Panicum Ecklonii, Nees. Kentani, valleys, on margins of woods, 69; frequent, 9.

Oplismenus africanus, Beauv. Kentani, in forest shade, 2037, 2038; 2.

Axonopus semialatus, Hook. f. Kentani, valleys and veld, 70; 11.

Setaria sulcata, Raddi. Kentani, valleys, 687; frequent, 3.

Setaria Lindenbergiana, Stapf. Kentani, valleys, 239; frequent, 2.

Setaria nigrirostris, Dur. & Schinz. Kentani, among coarse valley grasses, 1385; frequent, 11.

Setaria perennis, Hack. Kentani, veld, 1130; common, 10.

Setaria aurea, A. Braun. Kentani, valleys, and Black Rock Cove, in marsh, 67, 2137; frequent, 11, 12.

Setaria verticillata, Beauv. Kentani, a garden weed, 426; 2.

Pennisetum macrourum, Trin. Qolora Mouth, along streams, 2061; 12.

Stenotaphrum glabrum, Trin. Kentani, coast just above beach, making thick carpet, 84; 12.

Tricholaena setifolia, Stapf. Kentani, grassy slopes, 73; 5, 9.

Tristachya leucothrix, Trin. Kentani, veld, 1100; common, 4.

Koeleria cristata, Pers. Kentani, valleys, 1146; occasional, 11.

Avenastrum caffrum, Stapf. Kentani, among tall valley grasses, 2057; 5.

Phragmites communis, Trin. Kentani, along streams, and near Qolora Mouth, along marshy places, 1094, 443; 3, 4.

Polypogon tenuis, Brongn. Kentani, coast, in swampy ground, 280; 12.

Polypogon monspeliensis, Desf. Kentani, marshy places, 1809; 1.

Agrostis lachnantha, Nees. Kentani, along and in streams, 1384; locally frequent, 11.

Aristida capensis, Thunb. Near mouth of Gogwana River, 265; 7.

Aristida junciformis, Trin. & Rupr. Kentani, valleys, growing in masses, 238; 3.

Stipa Dregeana, Steud., var. elongata, Stapf. Kentani, along streams, 1106; occasional, 5.

Sporobolus indicus, R. Br., var. laxus, Stapf. Kentani, veld, 1055; common, 2.

Eragrostis curvula, Nees. Kentani, hill-slopes, 83; 3.

Eragrostis plana, Nees. Kentani, veld, 1057; frequent, 2.

Eragrostis brizoides, Nees. Kentani, veld, 1131; common, 10.

Cynodon Dactylon, Pers. Kentani, near homesteads and along foot-paths, 246; 2.

Chloris virgata, Swartz. Kentani, along pathways and waste places, 2046, 2047; occasional, 4.

Chloris gayana, Kunth. Kentani, along roadways, 1418; 2.

Eleusine indica, Gaertn. Kentani, waste land, 1059; 2.

Dactyloctenium aegyptiacum, Willd. Black Rock Cove, 2134, 1352; 6—8.

Potamophila prehensilis, Benth. Manubie Forest, 1338; 4.

Ehrharta erecta, Lam. Kentani, waste land, 1391; occasional, 11.

Ehrharta calycina, Sm. Black Rock Cove, 1306, 2087; rare, 10, 12.

Melica racemosa, Thunb. Kentani, among coarse valley grasses, 1392; occasional, 11.

Briza minor, Linn. Kentani, waste land, garden escape?; 11.

Poa annua, Linn. Kentani, near habitations, 2048; locally frequent, 4.

Poa heterogama, Hack. Kentani, valleys, 50; 8.

Festuca longipes, Stapf. Columba Valley, near Kobonqubo, 1389; 11.

Bromus unioloides, H. B. K. Kentani, waste land, introduced, 87; 10.

Brachypodium flexum, Nees. Kentani, along streams, 285; 3.

FILICES

Trichomanes pyxidiferum, Linn. Kentani, forest, on rocks and decayed wood, 24; 7—2.

Adiantum Capillus-veneris, var. minor, Linn. Kentani, along streams, 95; common, 7—2.

Hypolepis Bergiana, Hook. Kentani, in woods, 459; rare, 7—2.

Cheilanthes parviloba, Sw. Kentani, between rocks, overlooking streams, 269; occasional, 12.

Doryopteris concolor, Ruhn. Kentani, in forests, 244; frequent, 7—2.

Pellaea viridis, Forsk. Kentani, in any sheltered place, 230; common, 7—2.

Pellaea viridis, Forsk., var. glauca. Kentani, among stones, veld, 502; common, 7—2.

Pellaea viridis, Forsk., var. macrophylla. Kentani, in woods, 503; occasional, 7—2.

Pellaea hastata, Thunb. Kentani, veld, in clefts of rocks, 705; frequent, 7—2.

Pteris cretica, Linn. Kentani, along streams, 128; locally frequent, 7—2.

Pteris dentata, Forsk. Kentani, along streams and damp valleys, 20; occasional, 7—2.

Pteris Aquilina, Linn. Kentani, margin of woods, 126; common, 7—2.

Blechnum australe, Linn. Kentani, near streams, 94; common, 7—2.

Asplenium erectum, Bory., var. lunulatum, Sw. Kentani, damp woods, 100; frequent, 6—3.

Asplenium erectum, Bory., var. minor, Sim. Kentani, forests, on decayed wood, 489; common, 6—3.

Asplenium gemmiferum, Schr. Kentani, forests, 243; rare, 6—3.

Asplenium rutaefolium, Kunze. Kentani, damp, shady woods, 132; common, 6—3.

Asplenium cuneatum, Lam. Kentani, shady woods, 101; common, 6—3.

Aspidium aculeatum, Sw. Kentani, forests, 270; occasional, 6—3.

Aspidium adiantiforme, J. Sm. Kentani, along streams, forest-shaded, 775; rare, 6—3.

Cyrtomium falcatum, Pr. Kentani, forests, 708; rare, 6—3.

Dryopteris Bergiana, O. Kuntze.

Nephrodium Bergianum, Baker. Kentani, along streams, 14; frequent, 6—3.

Polypodium polypodioides, Hitchcock (incanum, Sw.). Kentani, on forest trees, 538; frequent, 9—3.

Polypodium lanceolatum, Linn. Kentani, on rocks and trees, 358; 586; rare, 9—3.

Cyclophorus africanus, C. Chr. (Polypodium africanum, Mett.). Kentani, on Encephalartos Altensteinii, 303; rare, 9—3.

Notholaena Eckloniana, Kunze. Kentani, on bare rocks, veld, 704; rare, 11—2.

Osmunda regalis, Linn. Kentani, forest ravines, 812; rare, 10—2.

Aneimia Dregeana, Kunze. Kentani, forest, 22; occasional, 10—2.

Mohria caffrorum, Desv. Kentani, among Erianthus, 99; common, 10—2.

Ophioglossum reticulatum, Linn. Kentani, among Erianthus, hill-slopes, 825; rare, 10—2.

LYCOPODIACEAE

Lycopodium verticillatum, Linn. Kentani, on rocks in forest, 821; rare, 4.

Selaginella depressa, A. Br. Kentani, prostrate on banks, where sheltered and damp, 893; occasional, 2.

Selaginella Kraussiana, A. Br. Kentani, shady damp places, 7; common, 2.

AN ENUMERATION OF THE FUNGI COLLECTED AT KENTANI IN THE CAPE PROVINCE BY MISS ALICE PEGLER, A.L.S., FROM 1911—1914

By I. B. POLE EVANS, M.A., B.Sc., F.L.S.,

and AVERIL BOTTOMLEY, B.A.

The fungi enumerated below were collected by Miss Alice Pegler, A.L.S., chiefly in the Kentani district of the Cape Province during the years 1911—1914, and kindly forwarded by her from time to time for identification. A few of these fungi have been described in mycological journals not easily accessible to the general public, but hitherto no attempt has been made to enumerate the fungi of this district, which has now only become possible through Miss Pegler's labours.

The list may be regarded as a fairly representative one of the fungi submitted to us, but naturally does not include a certain amount of material which was immature, or insufficient for identification purposes. It also includes a few fungi which we have not examined. Miss Ethel M. Doidge has kindly undertaken the examination and description of the *Meliolas* included in the list.

HYSTERIINEAE.

HYSTERIACEAE.

Hysterostomella tenella, Syd. in Annal. Mycol. x. No. 5, 1912, p. 442.

Stromatibus amphigenis vel caules plus minus ambientibus, effusis, irregularibus, 2—10 mm. longis, tenuissime crustaceis, arcte adnatis, atris, glabris; loculis seu peritheciis numerosis, irregularibus, rimose vel irregulariter dehiscentibus, minutis; ascis primitus subglobosis vel ovatis cum sporadiis conglobatis, dein clavatis cum sporidiis distiche ordinatis, ad apicem valde incrassatis, 45—60 × 16—20μ, octosporis; sporidis ellipsoideo-oblongis, utrinque rotundatis, medio vel circa medium 1-septatis et constrictis, ex hyalino brunneis, 14—17 × 7—8μ.

On stems and branches of *Asparagus* sp., Butterworth, 19. iii. 1912 (Pegler, No. 1866, Pole Evans, Nos. 2240 and 2369); also on phylloclades of *Asparagus striatus*, Thunb., near Despatch, Uitenhage, collected by Ethel M. Doidge, 24. iii. 1914. (Pole Evans, No. 1241 (type).)

PLECTASCINEAE.

ASPERGILLACEAE.

Meliola amphitricha, Fr.

On leaves of *Grumilea globosa*, Hochst., Kentani, 29. v. 1912. (Pegler, No. 1875, Pole Evans, No. 2366.)

On leaves of *Gardenia globosa*, Kentani, 1. iv. 1912. (Pegler, No. 1858, Pole Evans, No. 2214.)

On *Olea Pegleri*, Wright, Kentani, 29. viii. 1914. (Pegler, No. 1948, Pole Evans, No. 8382.) Material immature.

Meliola arcuata, Doidge.

On stems of *Viscum* sp., Kentani, 1. vi. 1912 and 4. viii. 1914. (Pegler, Nos. 1881 and 1949, Pole Evans, Nos. 2364 and 8389.)

Meliola Peglerae, Doidge.

On leaves of *Anastrabe integerrima*, Kentani, iv. 6. 1912. (Pegler, No. 1883, Pole Evans, No. 2363.)

Meliola capensis, K. & Cke.

On leaves of *Hippobromus alatus*, Kentani, 7. ix. 1914. (Pegler, No. 1956, Pole Evans, No. 8391.)

On *Hippobromus alatus*, Winkle Spruit, 6. vii. 1912, E. M. Doidge. (Pole Evans, 2499.)

On *H. alatus*, Verulam, 3. vii. 1913, I. B. Pole Evans. (Pole Evans, No. 6805.)

On *H. alatus*, Tongaat, 12. ix. 1913, P. A. van de Bijl. (Pole Evans, No. 6953.)

Meliola ganglifera, Kalch.

On host undetermined, Kentani, 7. x. 1914. (Pegler, No. 1953, Pole Evans, No. 8392.)

Meliola sp.

On *Trichilia* sp., Kentani, 16. ii. 1914. (Pegler, No. 1971, Pole Evans, No. 8786.)

PERISPORIALES.

ERYSIBACEAE.

Erysibe cichoracearum, DC.

On leaves of *Cucurbita Pepo*, Kentani, 5. iii. 1913. (Pegler, No. 1911, Pole Evans, No. 6581.)

Phyllactinia corylea (Pers.), Karst.

On leaves of *Tropaeolum* sp., Kentani, 14. ii. 1913. (Pegler, No. 1910, Pole Evans, No. 5668.) Only conidial stage seen.

PERISPORIACEAE.

Capnodium sp.

On leaves of *Royena* sp., Komgha, 4. iii. 1912. (Pegler, No. 1894, Pole Evans, No. 2192.) Material immature.

Apiosporium sp.

On leaves of *Celastrus* sp., Butterworth, 19. iii. 1912. (Pole Evans, No. 2188.) Material immature.

Asterina sp.

On *Tricalysia* sp., Kentani, 16. xii. 1914. (Pegler, No. 1970, Pole Evans, No. 8787.)

Epichloe Eragrostis, Pole Evans.

On haulms of *Eragrostis plana*, Kentani, 29. ii. 1912. (Pegler. No. 1855, Pole Evans, No. 2076.)

Claviceps sp.

On *Panicum maximum*, Kentani, 13. v. 1913. Butterworth, 27. iv. 1914 (Pegler, Nos. 1980 and 1931, Pole Evans, Nos. 6920 and 7740.)

On *Digitaria ternata*, Butterworth, 27. iv. 1914. (Pegler, No. 1979, Pole Evans, No. 7741.) Ascigerous stage not seen.

Montagnella Peglerae, Pole Evans.

On living plants of *Rapanea melanophleos*, Kentani, 3. iv. 1912 and v. 1913. (Pegler, Nos. 1865 and 1892, Pole Evans, Nos. 2206 and 6620.)

Asterodothis solaris (Kalch. & Cke.), Th., Ann. Mycol. x. (1912), p. 179.

On living plants of *Gymnosporia* sp., Kentani, 20. vii. 1912. (Pegler, No. 1902, Pole Evans, No. 2533.)

This fungus was originally described as *Asterina solaris*, Kalch. & Cke., Grev. IX. (1880), p. 33.

On living leaves of *Olea verrucosa*.

Oligostroma Proteae, Syd., in Ann. Mycol. XII. No. 3, 1914, p. 265.

Stromate amphigeno, plagulas atras irregulares subinde confluentes 1—5 mm. longas planiusculas efficiente, in epidermide sito, atro; loculis peritheciiformibus solitarie sub-epidermide sitis, omnino immersis, sed haud folium penetrantibus, globosis vel ovato-globosis, 100—120μ diam., pariete bene evoluto, ostiolo haud typico; ascis sessilibus, cylindraceo-clavatis, vel clavatis, apice rotundatis, 75—100 × 16—20μ, aparaphysatis, 4—6-sporis; sporidiis oblique monostichis usque distichis, oblongo-cuneatis, supra medium 1-septatis, non constrictis, totis 24—28μ longis, loculo superiore breviore sed latiore rotundato vel ovato 8—10μ longo, 8—9μ lato, inferiore longiore sed angustiore 15—19 × 6—8μ, hyalinis vel subhyalinis.

On leaves of *Protea Flanaganii*, Kentani, 17. vii. 1912. (Pegler, No. 1899, Pole Evans, No. 5163.)

A new genus of the Phyllachoraceae showing affinities with *Phyllachora*, but chiefly in its septate spores.

Phyllachora sp.

On leaves of *Erianthus* and *Andropogon*, Kentani, 13. v. 1914. (Pegler, No. 1940, Pole Evans, No. 8348.)

SPHAERIALES.

CORYNELIACEAE.

Corynelia clavata (L.), Sacc.

On living leaves of *Podocarpus* sp., Kentani, 25. vi. 1913. (Pegler, No. 1917, Pole Evans, No. 6900.)

Corynelia carpophila, Syd.

On fruits of *Rapanea melanophleos*, Kentani, 5. x. 1912. (Pegler, No. 1861, Pole Evans, No. 5617.)

XYLARIACEAE.

Xylaria hypoxylon (Linn.), Grev.

On rotten wood under *Acacia horrida*, Kentani, 20. x. 1906. (Pegler, No. 1372, Pole Evans, No. 8420.)

BASIDIOMYCETES.

USTILAGINEAE.

Ustilago Peglerae Búbak & Sydow in Annal. Mycol. XII. No. 3, 1914, p. 264.

Soris olivaceo-nigris, antheras destruentibus; sporis ellipsoideis, oblongis vel irregularibus, rarius subglobosis vel ovoideis, $9\frac{1}{2}$—18×7—$9\frac{1}{2}\,\mu$, verruculosis, chlorino-brunneis.

On anthers of *Ornithogalum lacteum*, Kentani, 12. xi. 1913. (Pegler, No. 1921, Pole Evans, No. 7101.)

Also on anthers of *Eucomis punctata*, Kentani, 12. xii. 1911, and 14. xii. 1914. (Pegler, No. 1852, Pole Evans, Nos. 2001 and 8795.)

Ustilago olivacea (DC.), Tul.

In ovaries of *Carex Phacota*, Kentani, 17. xii. 1914. (Pegler, No. 1972, Pole Evans, No. 8812.)

Sorosporium reilianum (Kuhn), McAlp.

On *Zea Mays*, Kentani, 20. ii. 1912. (Pegler, No. 1853.) Specimens not recorded by us.

UREDINALES.

ENDOPHYLLACEAE.

Endophyllum elegans (Diet.), Pole Evans. Dietel in Hedwigia, XXVIII. (1889), p. 180.

Pycnidiis epiphyllis, melleis, minutis congregatis circa $180\,\mu$ diam.; soris hypophyllis, petiolicolis vel fructicolis, maculis flavis, leviter elevatis, pseudoperidiis cylindraceis usque 1 mm. elongatis, albidis, margine irregulariter lacerato; cellulis pseudoperidii polygonis, margine striato; teleutosporis catenulatis, polyhedricis, 25—34 × 27 μ, aurantiacis, episporio 3—9 μ crasso, hyalino, verrucoso.

On leaves, petioles and fruits of *Rhamnus prinoides*, Kentani, 4. iii. 1912. (Pegler, No. 1849, Pole Evans, Nos. 379, 1772 and 2097.)

This fungus was first submitted to us from Haenertsburg in the Northern Transvaal on 24. vi. 1907 and on germinating the spores it was found that they were typical of *Endophyllum*, hence its transference to this genus.

Miss Pegler has been good enough to supply us with large quantities of fresh material of this fungus from time to time for detailed investigation of its life-history.

MELAMPSORACEAE.

Pucciniastrum Agrimoniae (D.C.) Diet.

On living leaves of *Agrimonia Eupatoria*, Kentani, 12. iv. 1912. (Pegler, No. 1889, Pole Evans, No. 2353.)

PUCCINIACEAE.

Uromyces Bidentis Lagh.

On leaves of *Bidens pilosa*, Kentani, May 1914. (Pegler, No. 1936, Pole Evans, No. 7769.)

Uromyces Hyperici-frondosi (Schw.), Arth.

On leaves of *Hypericum natalense*, Kentani, 7. xi. 1914. (Pegler, No. 1961, Pole Evans, No. 8791.)

Uromyces Dolicholi, Arth.

On leaves of *Rhynchosia Harmssiana*, Kentani, 18. vi. 1914. (Pegler, No. 1941, Pole Evans, No. 7811.)

Uromyces Fabae (Pers.), de Bary.

On leaves of *Vicia Faba*, Butterworth, 14. vii. 1914. (Pegler, No. 1943, Pole Evans, No. 8347.)

Uromyces appendiculatus (Pers.), Link.

On leaves of *Phaseolus vulgaris*, Kentani, 1. v. 1914. (Pegler, No. 1932, Pole Evans, No. 7769).

Uromyces Eckloni Búbak.

On leaves of *Freesia* sp., Komgha, 24. viii. 1912. (Pegler, No. 1898, Pole Evans, No. 5129.)

Uromyces Gladioli, P. Henn.

On leaves of *Gladiolus maculatus*, Kentani, 31. x. 1914. (Pegler, No. 1958, Pole Evans, No. 8412.)

Uromyces Sparaxidis Syd.

On leaves of *Dierama pulcherrima*, Kentani, 21. v. 1913. (Pegler, No. 1914, Pole Evans, No. 6677.)

Uromyces Peglerae, Pole Evans, in Annal. Mycol. XII. (1913), No. 3, p. 263.

Soris uredosporiferis amphigenis, plerumque hypophyllis, sparsis, rotundatis vel ellipticis, minutis, $\frac{1}{2}$—$\frac{3}{4}$ mm. diam., diu epidermide tectis, flavis vel flavo-ferrugineis; uredosporis globosis vel subglobosis, flavis, tenuiter echinulatis, 20—25 × 19—24μ, episporio 1$\frac{1}{2}$—2μ crasso, poris germinationis 4—6 sparsis instructis; soris teleutosporiferis conformibus, sed atris, diu vel semper epidermide plumbea tectis; teleutosporis variabilibus, saepe angulatis, subglobosis, ovatis vel piriformibus, ad apicem plerumque truncatis vel rotundatis, modice incrassatis (usque 5μ), basi attenuatis, levibus, flavo-brunneis, ad apicem castaneo-brunneis, 24—30 × 15—20μ; pedicello brevi usque 25μ longo, subhyalino vel superne leniter colorato.

On leaves of *Digitaria ternata*, Kentani, 30. iv. 1914. (Pegler, No. 1928, Pole Evans, No. 7755.)

Uromyces mimusops, Cke.

On *Mimusops caffra*, Kentani, 29. xii. 1912. (Pegler, No. 1908.) Specimens not recorded by us.

Puccinia africana Cke.

On leaves of *Spilanthes Acmella*, Kentani, 19. xii. 1913. (Pegler, No. 1922, Pole Evans, No. 7088.)

Puccinia Leucadis, Syd.

On leaves of *Leucas martinicensis*, Kentani, 18. vi. 1914. (Pegler, No. 1942, Pole Evans, No. 7810.)

Puccinia Plectranthi, Thuem.

On leaves of *Plectranthus laxiflorus*, Kentani, 8. v. 1914. (Pegler, No. 1937, Pole Evans, No. 7726.)

Puccinia Lindaviana, P. Henn.

On leaves of *Strychnos* sp., Kentani, 7. x. 1914. (Pegler, No. 1951, Pole Evans, No. 8394.)

Puccinia kentaniensis, Pole Evans.

On living plants of *Toddalia lanceolata*, Kentani, 17. xii. 1914. (Pegler, No. 1960, Pole Evans, No. 8793.)

Puccinia Pelargonii (Thuem.), Syd.

On leaves of *Pelargonium* sp., Kentani, 12. viii. 1914 and 7. ix. 1914. (Pegler, No. 1946, Pole Evans, Nos. 8349 and 8380.)

Puccinia Malvacearum, Mont.

On leaves of *Malva parviflora*, Kentani, 12. xii. 1911. (Pegler, No. 1851, Pole Evans, No. 2000.)

Puccinia pulvinata, Massee.

On leaves and fruits of *Osyridocarpus natalensis*, Kentani, 12. vi. 1914. (Pegler, No. 1945, Pole Evans, No. 8351.)

Puccinia Digitariae, Pole Evans.

On leaves of *Digitaria debilis*, Willd., Kentani, 5. vi. 1912. (Pegler, No. 1879, Pole Evans, No. 2372.)

Puccinia Maydis, Bereng.

On leaves of *Zea Mays*, Kentani, 23. ii. 1912. (Pegler, No. 1854, Pole Evans, No. 2138.)

Puccinia Pruni-spinosae, Pers.

On leaves of *Prunus persica*, Kentani, 21. v. 1912. (Pegler, No. 1873.) Specimens not recorded by us.

Haemaspora longissima (Thuem.), Korn.

On living plants of *Rubus pinnatus* and *R. rigidus*, Kentani and Komgha, 12. vi. 1912 and 9. vii. 1912. (Pegler, Nos. 1887, 1888, and 1897, Pole Evans, Nos. 2350 and 5161.)

Ravenelia inornata (Kalch.), Diet.

On leaves of *Acacia* Karroo, Kentani, 3. vi. 1912, 23. vii. 1912. (Pegler, Nos. 1877 and 1878, Pole Evans, Nos. 2368 and 2541.)

Ravenelia ornamentalis (Kalch.), Diet.

Aecidia on flower buds of *Acacia* Karroo and deforming them, forming large globular galls 2—3 cm. diam., Kentani, 16. i. 1914. (Pegler, No. 1794, Pole Evans, No. 7367.)

Ravenelia Peglerae, Pole Evans.

On leaves, petioles and pods of *Acacia eriadenia*, Kentani, 21. v. 1912 and 23. vi. 1912. (Pegler, Nos. 1874 and 1876, Pole Evans, Nos. 2331 and 2544.)

Ravenelia glabra, Kalch. & Cke.

On leaves of *Calpurnia sylvatica*, Kentani, 1. v. 1912. (Pegler, No. 1870, Pole Evans, No. 2320.)

Aecidium Cookeanum, De Toni.

On leaves of *Loranthus Regii*, Kentani, 12. xii. 1911. (Pegler, No. 1850, Pole Evans, No. 1999.)

Aecidium osyridocarpi, Massee.

On leaves and fruits of *Osyridocarpus natalensis*, Kentani, 12. viii. 1914. (Pegler, No. 1944, Pole Evans, No. 8350.) Most probably aecidial stage of *Puccinia pulvinata*, Mass.

Caeoma Clematidis, Thuem.

On leaves of *Clematis brachiata*, Kentani, 6. vi. 1912. (Pegler, No. 1884, Pole Evans, No. 2359.)

Uredo Cypericola, P. Henn.

On leaves of *Cyperus distans*, Kentani, 11. ii. 1914. (Pegler, No. 1926, Pole Evans, Nos. 7403 and 7744.)

TREMELLACEAE.

Hirneola polytricha, Mont.

On *Melia Azedarach* stump, Kentani, 15. ii. 1907. (Pegler, No. 1424, Pole Evans, No. 8755.)

Hirneola Auriculae-Judae (L.), Berk.

Kentani. (Pegler, No. 766.) Specimens not seen, and Miss Pegler informs us that they were destroyed.

HYMENOMYCETINEAE.

THELEPHORACEAE.

Stereum membranaceum, Fr.

On decayed wood, Kentani, 22. vii. 1905. (Pegler, No. 1234, Pole Evans, No. 8414.)

Stereum hirsutum, Pers.

On bark, Kentani, 1907. (Pegler, No. 1449, Pole Evans, No. 8756.)

POLYPOREAE.

Polystictus sanguineus (L.), Mey.

On decayed wood, Kentani, 12. viii. 1905. (Pegler, No. 1239, Pole Evans, No. 8416.)

Favolus multiplex, Lev.

On decayed wood, Kentani, 5. x. 1905. (Pegler, No. 1271, Pole Evans, No. 8417.)

AGARICACEAE.

CANTHARELLEAE.

Cantharellus sp.

In tufts on decayed wood, Kentani, 12. viii. 1905. (Pegler, No. 1235, Pole Evans, No. 8415.) Specimen in too bad a state of preservation to admit of specific determination.

Cantharellus sp.

Growing at roots of *Erianthus* sp., Kentani, 21. x. 1906. (Pegler, No. 1371, Pole Evans, No. 8419.)

COPRINEAE.

Coprinus stercorarius, Fr.

On manure, Kentani, 14. xii. 1914. (Pegler, No. 1965, Pole Evans, No. 8839.)

Coprinus sp.

On manure, Kentani, 9. xii. 1914. (Pegler, No. 1963, Pole Evans, No. 8837.)

Coprinus sp.

On manure, Kentani, 14. xii. 1914. (Pegler, No. 1964, Pole Evans, No. 8838.)

PHALLINEAE.

CLATHERACEAE.

Kalchbrennera Tuckii (Kalch. & MacOwan), Berk.

Along footpath, Kentani, 9. ii. 1907. (Pegler, No. 1423, Pole Evans, No. 8848.)

LYCOPERDINEAE.

LYCOPERDACEAE.

Geaster saccatus, Fr.

On soil under *Solanum aculeastrum*, Kentani, 9. x. 1906. (Pegler, No. 1370, Pole Evans, No. 8418.)

Geaster minimus, Schwein.

On veld, Kentani, 1. x. 1906. (Pegler, No. 1425.) Specimens not seen by us.

PLECTOBASIDIINEAE.

TULOSTOMATACEAE.

Tulostoma mammosum (Micheli), Pers.

Kentani. (Pegler, No. 753.) Specimens not seen by us.

HYPHOMYCETES.

DEMATIACEAE.

Helminthosporium crustaceum, P. Henn.

On ovaries of *Sporobolus fimbriatus*, Kentani, 14. v. 1913. (Pegler, No. 1916, Pole Evans, No. 6667.)

Macrosporium violae, Polacci.

On leaves of *Viola odorata*, Kentani, 21. vii. 1912. (Pegler, No. 1906, Pole Evans, No. 6572.)

Hyalodema Evansii, Magn.

On fruits of *Zizyphus mucronata*, Kentani, 14. xii. 14. (Pegler, No. 1966, Pole Evans, No. 8789.)

Isaria Psychididae, Pole Evans.

On *Chaliodes Junodi*, Kentani, 10. ix. 1913. (Pegler, No. 1919.) Specimens not recorded by us.

TUBERCULARIACEAE.

Fusarium heterosporium, Nees.

In ovaries of *Panicum maximum*, Kentani, 10. iv. 1913, Butterworth, 27. iv. 1914, and in ovaries of *Digitaria ternata*, Kentani, 27. v. 1913, Butterworth, 27. iv. 1914. (Pegler, No. 1915, 1930, Pole Evans, Nos. 6649, 6919, 6666 and 7743.)

Cerebella Cynodontis, Syd.

In ovaries of *Cynodon dactylon*, Kentani, 9. iii. 1912. (Pegler, No. 1857, Pole Evans, No. 2189.)

Cerebella Panici, Tracy & Earle.

In ovaries of *Panicum maximum*, Kentani, 10. v. 1913, Butterworth, 27. iv. 1914, and in ovaries of *Digitaria ternata*, Butterworth, 27. iv. 1914. (Pegler, No. 1929, Pole Evans, Nos. 6648, 7739 and 7742.)

THE BOTANICAL LABORATORIES OF THE UNION OF SOUTH AFRICA, PRETORIA.

EDWARD GEORGE KENSIT

By A. M. TUGWELL.

"To the memory of Edward George Kensit, Assistant in this Herbarium, 1912—1915, who fell in action at Delville Wood, July 18th, 1916.

"He volunteered for a dangerous mission; although wounded early in its execution, he carried out his instructions; painfully retracing his steps he gave the information required and fell dead. 'Omnibus his nivea cinguntur tempora vitta.'"

Such the brief legend on the brass tablet in the Bolus Herbarium of the S.A. College, Capetown, fittingly summarising the climax of a strong clean life.

Edward Kensit, the youngest of a large family, was born in March, 1879, his mother dying four months after.

Nothing noteworthy happened to him until the Anglo-Boer War broke out, when he joined Brabant's Horse, going right through that campaign and ending up in 1901 by entering the Vryburg Police.

Here to him, nervously alive to the beauty of vast spaces, came the call of the desert and he followed the Voice.

That Bechuanaland desert trading trip, albeit thickly set with privations, was to him a golden glory always; but being the artist he was, needless to say he returned rich in all save money. In 1907 he set out on another trading trip: faring worse than before and his health breaking down completely, he returned home to be nursed. For the greater part of 1911 he was recuperating. In 1912, sufficiently restored, he joined the staff of the Bolus Herbarium where he remained doing splendid work both on a collecting trip with his friend St C. Caporn, which resulted in a fine haul of rich material for the Herbarium no less than for the National Botanic Gardens, and also in private and reliable investigation of the Order Leguminosae, until he left for England, a volunteer in the S.A. Infantry.

One recalls his cheerfulness; at times when he was depressed, he needed but to see a friend in similar state and straightway his spirit would take the leap from self and he would be cheering the other, himself quite forgotten.

One recalls too the marvellous finding sympathy he had, indeed in him it almost amounted to an instinct, for so surely as the needle points to the

North, so certainly did his sympathetic instinct find, point and set to the worth in his fellow creatures and draw them to him, to wit the following friendship instantly decided on. The quotation is from a letter. "He was my friend,—a friend for friendship's sake; for no two ever differed more than we did. Could any man ask for better? Four short years did I know him, but always I think back to that first time when he whistled himself into the Library, hushed in that sudden way of his, when he saw me sweating at Kerner, and then introduced himself via his beloved Burchell. And neither knew the other's name for weeks, nor thought to ask." But Kensit knew he had found a comrade and was content, and just as he was wont to find and abide by the truest in mankind, methinks he trusted it to be found in him, no question asked, and he was dumb where excuse might have served to divert some measure of blame from himself at times. How little do we recognise the great spirit in life! Strange that in the twinkling of an eye, in the very instant of Death, the veil should be lifted and we should see face to face. Strange too that it should take so great a War to point us back to the numberless deeds of selflessness in Peace, which we, in our dalliance, had passed by unheeded.

Quietly and without fuss the South Africans left for England. In Borden Camp they were kept training for some time. From England they sailed for Egypt, arriving at Alexandria on January 11th, 1915, in the troop-ship "Saxonia" carrying nearly 4000 troops. Useless it were, to speak of the discomfort, an almost unavoidable concomitant of any such voyage when men are packed into space that will accommodate but half their number, roughly speaking. There is no complaint in any of the letters—sometimes the bald statement of a fact which we have known of but hardly realised occurs in such phrases as "no place to sleep—wet clothes as well—for food we wait for hours in a row and when you get there you are too hot to eat." Immediately, however, he washes out any adverse effect of criticism by the more than compensating item of interest, "we were chased by a submarine, but two of our boats captured it—I saw it being towed in," and here the artist in generous appreciation of work skilfully performed, "Man! there are some brave men about." All through the correspondence runs this generous tribute of free admiration of the British soldier in action.

The South Africans left Alexandria by sea early in February and arrived at Mersa Matru "after an exciting trip on a *pleasure boat* on a rough sea!" Then "began our march along this Mediterranean shore. We never left the sea until we began climbing the Libyan Mountains." "Our march" was 106 Egyptian miles which another South African says are like back-veldt miles—*very long* ones! Here they were going over loose and stony ground and our men suffered much from blistered feet.

Mersa Matru they found very much like the exposed sea-fronts of Muizenberg and Fish Hoek. Here during one of those cruel dust storms with faces cut by the driving sand and eyes blinded Kensit, with a small number of men, was told off to put up tents for men who would be arriving that day. He writes how the task seemed all but hopeless, but how they were determined the tents should be there when the men arrived, and they did it although it took them the greater part of the day. Fresh water was very scarce here at Matru—well water was usually brackish and used for the animals, whilst the troops got about one water-bottle per man per diem.

Egypt and the Western Front was the land of glamour and romance to Kensit, no less than the land of hardship and maddening privations. All day there would be the burning sun on the monotonous march and at night heavy dews to soak the only blanket each man had; but monotony of march and the blaze of the noonday sun were alike forgotten in the wonderful find of a flower, to be pressed and jealously kept and carried until such time as it might be sent to the home people. Do you wonder that these flowers are held more precious than hard earned gold—the beautiful golden and scarlet ranunculi and the purple mallow—carried into the battle and brought back again from Death?

Or the beautiful sunsets would refresh him or some coast view or desert scene of palms and camels—"Oh! this land is very wonderful! I would love to be with you and tell you all and then *come back*."

The march from Mersa Matru was in a south-westerly direction; at some of the stopping stages they had to make dug-outs and sand-bag forts, and he proudly tells of two scouting expeditions over some mountains where he noticed "a brown orchid growing very plentifully."

On the 25th of February the Senussi were reported to be concentrating near some well south-east of Barani. The British forces were encamped at Wadi Maktel near the beach, the intention being to strike at the enemy about dawn next day. But the unexpected happened, the enemy suddenly attacking the camp about dusk.

Next day came the Battle of Agagia. The enemy under Gaafar Pasha had their main position on a ridge of sand hills running parallel to the Khedivial Road. Our men moved up from the sea coast in a south-westerly direction, crossed this road and advanced, line after line as on parade, to the attack under an unheeded heavy fire from machine and field guns and rifles. The enemy was completely routed, Gaafar and his staff falling into our hands and the rest fleeing in scattered parties.

Kensit tells of a comrade falling by his side and himself pressing on. To those who knew him, it is but one more of the illuminating details which have placed him upon the shining tablelands. Well one knows that the soldier is strictly taught to press forward nor look at the fallen comrade, and excitement may rob a man of the consciousness of aught beside the fight, but not so to him, whose life three-fourths was spent for others; surely to him no sterner task than keeping to his oath under such circumstances. He writes "We marched with little food to catch this crowd and we did meet them to our cost—the very hottest fire that I was ever under—the way in which the Yeomanry charged made me cry. I was close and saw it all. They went in with lances against machine guns and big guns and they were very few and our enemy were 1500 strong." And here some irrelevancy, "I am always with you in thought, and when those bullets were passing me I thought of you all at your 11 o'clock tea"; but again he goes back in splendid admiration of the Yeomanry, his own share not included, "I would like to tell you more of the brave charge—it was too brave for words."

Perhaps the stray thought of 11 o'clock tea has to account for the following episode told by his young nephew. "In Egypt after advancing under heavy rifle and machine fire for about 2 miles in open ground, was Pansy tired? No! He and a friend of his, Cpl. Forbes, pressed forward beyond the others. The next thing our chaps saw, was a camel tearing over the ground with Pansy and Archie hanging on to it. They took the risk just to get some dates off the enemy camels." The next entry after the battle reads: "Now, I must close and wash my feet, they are all blistered and very sore indeed, and try for a sleep. Have been up three nights so far, so you see we are in it all."

From Agagia they marched to Barani, a coastguard station, which they found in ruins "thanks to the good marksmanship of our naval gunners." Here just at first Kensit realises his weary state. He says: "I found some nice chess-men here; but I never took them—I was too tired." Here too was the joy to him of finding "a patch of some liliaceous plant, like an Ornithogalum, plentiful on the Kenilworth race-course."

He enjoyed himself at Barani perhaps the more for the arrival of the mail boat with letters and a parcel of much needed socks and soap.

From this place of high winds and sandstorms, more violent than any our men had experienced even in S.W. Africa, and deluges, they departed early in March for Sollum.

Of the hardships of that march over the inland plateau Edward Kensit writes very briefly, "They were mad with thirst. Lack of water was the only drawback." In one place they found water and also found "a dead Arab in the well. But, there were guards with fixed bayonets to keep the chaps away."

Here he noticed some *Gnidia* sp. growing and about six miles from Sollum he mentions the *Romulea* sp. "which we were digging up to secure moisture from the corms."

The weather was now getting very hot, the nights, however, still continuing cold and often wet. One march was begun at 4 a.m. and as another diary tells "we had no tea for a start, which is rough on a S. African." When the sun rose the heat became almost tropical. Soon after noon they rested for half-an-hour and then fell in again without a refill of the water bottles. This march seems to have been the very worst. The pass was occupied without opposition but men fainted from fatigue and thirst when they reached the top. Four long hours afterwards camels brought the water supply but some were so exhausted that they turned sick, unable to retain the precious fluid. This pass is known variously as Hill Thirsty and Hell Fire Pass.

Letters tell how men would take a drink and spit some back; tell too of how it pleased Kensit to do with less and ever less water, making acceptance of the priceless thing less hard for a comrade, by the proud boast of his sojourn in the desert of Southern Africa. And yet, and yet...physically he never was strong; spiritually he was of giant stature.

The march down was continued after a rest and to Kensit fatigue no longer existed once from below the beauty of situation and contour and colour came upon him from the little coast town of Sollum. Sollum offered many advantages—the colour of sea and sky, the straight line of Wadis against the horizon, the thrice blessed bathe in the open sea, ships loading and off-loading, mine sweepers, buildings going up, public and private interests—"I did enjoy watching it all and we did hard work there, but we were fit. I made a fine Kayah there out of paraffin tins."

It was here that he helped with "the famous road-making, 800 ft. up and turning the first corner. This road was an old Roman road built—years B.C." Here he noticed some Stapelia plants and shell fossil formation. And every day still a bit of the desert, which despite all was always dear to him, in the Senussi and Bedouin fugitives, who, driven by hunger and thirst, were coming in to ask pardon and seek protection.

"It was fine, I can assure you; I was sorry to leave." From Mersa Matru they were taken back to Alexandria, this time in a real pleasure boat, "a Cunard liner and a beauty and we had berths"; and thence to beautiful France, there to endure unprecedented hardships with which we have all become so familiar through the Press. Here Kensit's life takes on a peculiar brilliancy from within—it is as if an "inspiringness" clothes him about and the Christ idea of service and of bringing cheer and happiness to others becomes his self-imposed high duty in increasing proportions;—his spirit takes on fine dimensions. One young officer writes, "I know it isn't right, but I go to Kensit because he always cheers me." After a long march he writes, "I felt no fatigue, the land through which we passed was so beautiful." It was always thus, the green fields and flowers, a show of rhododendrons, the forget-me-not seen for the first time, the first call of the cuckoo—in Egypt he goes up the Nile to hear the birds sing—some beautiful building, these become the big things in France; and beyond everything to expend for a comrade his small strength of blood and bone and sinew, and for all, his high spontaneous duty of happiness.

Going to Ypres they got lost "and it rained all the way....My only wish was for something hot....Yes the time for *hot tea* is out of joint, but when it does come I shall make up for lost time." Many a time after a long march, especially in Egypt, when all were spent, Kensit would come up with a little tea for someone else, some youngster or an oldish man more wearied than the rest, and his own time would still be out of joint.

He talks of work in the trenches and one gets an impression of high good humour.

One night he had a narrow escape—"I put my head up a little too high and a bullet was there at once but only put some dust in my face. It was a lesson I shall never forget. I shiver now, as it was an explosive bullet." Another ticklish experience he had one night when he was chosen to put some sandbags on the front trenches which they had just taken over. "I was chosen because I was so small—10 minutes there seemed like hours and I was so sorry for being so small. But I was safe enough as the shots were going high. Mind you, our snipers go out in front, so I was not so brave after all."

On the last march "all along the road were cowslips" and later on "all the way looked like marching through Newlands Avenue" and just before the end "we marched through lands all red with red poppies."

Of the last fight, where our South Africans lost so heavily, there is this to tell, that unsuccess, as the world counts it, has oft equalled in splendour and endurance the most acclaimed success. A small band of men to take the wood and overwhelming odds against them. They began to move up on the 14th at daybreak and were successful in taking most of Longueval and Delville. They fought steadily on throughout the 15th and on the 16th took another portion of the wood. The particular section of the line where Kensit was became very dangerous and was so thinly held that rifle pits holding two men each had to be dug instead of trenches. In the late afternoon of this 16th day, suddenly we see Kensit coming down the line by himself, "having volunteered to see that we were all fairly connected up."

He chats with his comrades going and coming and is "bright and cheerful as ever and pleased to be in the thick of things." Throughout the day and night of the 16th they held on. The officer in command early noticed Kensit and calls him "a splendid man who cheered me a great deal in those hard hours." Early on the 17th they were more heavily attacked by bombs and machine guns and the enemy managed to pierce the line on the left. They managed to circumvent the Germans behind them. All that day and night they held on doggedly, raked by enemy fire and drenched by the rain. At dawn it was found that another portion of the line just to the right was open and they had to fill up this gap and connect with a flank whose whereabouts was unknown. A volunteer to ascertain the position of the flank and the strength of the enemy, was asked for. Again Kensit "stepped out at once and disappeared in the tangle of bush. We waited perhaps a quarter of an hour when he reappeared." He gave the required information, saluted, and almost immediately fell down and died. The fight became more and more pressing until only five of the platoon and 24 of the Company remained and, these being forced to retire, the wood was reoccupied by the enemy. And so at dawn Edward Kensit met the end—unostentatiously, unflinchingly, supported spiritually, for he was mortally wounded, for the performance of that last splendid duty. Methinks he walked into the Presence himself a shining radiance of the dawn.

To him no soldier's burial, to him no special cross or garland,

"For him no sombre requiem
No threnody of tears,"

but all the well-beloved flowers and beautiful trees for ever his in crowding friendship where he lies; and wheresoever he lies blessed for ever be that spot to Africa since it holds the rich dust of a faithful son.

"Blow out, you bugles, over the rich dead!"

EXPLANATION OF PLATES

PLATE IX

CRYPTOSTEMMA

All figures × 10, and drawn from living material.

Fig. 1. A newly opened disc-floret, with the projecting staminal tube still closed.

Fig. 2. A disc-floret at the completion of pollen presentation. The style head is thickly covered with yellow pollen.

Fig. 3. Curvature of the style in response to contact stimulus.

Fig. 4. An elongated style after removal of the pollen by insects.

Fig. 5. A young style, dissected from an unopened staminal tube.

Fig. 6. A staminal tube, partially covering the retracted style head.

Fig. 7. A disc-floret ready for pollination. The very short style branches have diverged, exposing the stigmatic surfaces.

PLATE X

A. EMPLEURUM FRAGRANS, GLOVER. B. ERICA LATIFLORA, L. BOLUS. C. ERICA ETHELAE, L. BOLUS. D. ERICA DULCIS, L. BOLUS.

A. Fig. 1, leaf; 2, flower ♂; 3, flower ♀; 4, ditto, longitudinal section; 5, carpel; 6, ditto, longitudinal section.

B. Fig. 1, leaf; 2, flower; 3, calyx and bracts; 4, sepal; 5, corolla; 6, stamen, side view; 7, ditto, back view; 8, ditto, front view; 9, gynaeceum—variously enlarged.

C. Fig. 1, leaf; 2, flower; 3, calyx and bracts; 4, sepal; 5, corolla; 6, stamen, side view; 7, stamen, back view; 8, gynaeceum—variously enlarged.

D. Fig. 1, node; 2, flower; 3, calyx and bracts; 4, sepal; 5, corolla; 6, stamen, back view; 7, stamen, side view; 8, gynaeceum—variously enlarged.

PLATE XI

A. ERICA GALLORUM, L. BOLUS. B. ERICA EXCAVATUM, L. BOLUS. C. ERICA WESTII, L. BOLUS. D. ERICA SYMONSII, L. BOLUS. E. ERICA CAMERONII, L. BOLUS.

A. Fig. 1, node; 2, flower; 3, calyx and bracts; 4, sepal; 5, corolla; 6, stamen, side view; 7, stamen, back view; 8, gynaeceum—variously enlarged.

B. Fig. 1, node; 2, flower; 3, calyx and bracts; 4, sepal; 5, corolla; 6, stamen, side view; 7, stamen, front view; 8, gynaeceum—variously enlarged.

C. Fig. 1, flower; 2, sepal; 3, corolla; 4, stamen, side view; 5, stamen, back view—variously enlarged.

D. Fig. 1, node; 2, flower; 3, corolla; 4, stamen, back view; 5, stamen, side view; 6, gynaeceum—variously enlarged.

E. Fig. 1, node; 2, bracts; 3, sepal; 4, corolla; 5, stamen, front view; 6, ditto, side view; 7, gynaeceum—variously enlarged.

PLATE XII

A. Erica elimensis, L. Bolus. B. Erica Varderi, L. Bolus.
C. Erica Dykei, L. Bolus.

A. Fig. 1, node; 2, leaf; 3, flower; 4, calyx and bracts; 5, sepal; 6, corolla; 7, stamen, side view; 8, ditto, back view; 9, gynaeceum—variously enlarged.

B. Fig. 1, node; 2, leaf; 3, flower; 4, sepal; 5, corolla; 6, stamen, back view; 7, ditto, side view; 8, gynaeceum—variously enlarged.

C. Fig. 1, node; 2, leaf; 3, flower; 4, calyx and bracts; 5, sepal; 6, corolla; 7, stamen, back view; 8, ditto, side view; 9, gynaeceum—variously enlarged.

PLATE XIII

A. Erica ventricosa, Thunb. B. Erica Pearsoniana, L. Bolus.
C. Erica arenaria, L. Bolus.

A. Fig. 1, leaf; 2, flower; 3, corolla from above; 4, corolla and ovary, longitudinal section; 5, 6, 7, perianth; 8, gynaeceum and stamens; 9, 10, 11, stamens—variously enlarged.

B. Fig. 1, node; 2, flower; 3, bracts; 4, sepal; 5, corolla; 6, stamen, side view; 7, ditto, back view; 8, gynaeceum—variously enlarged.

C. Fig. 1, branchlet; 2, node; 3, leaf; 4, flower; 5, calyx and bracts; 6, sepal; 7, corolla; 8, stamen, side view; 9, ditto, back view; 10, gynaeceum—variously enlarged.

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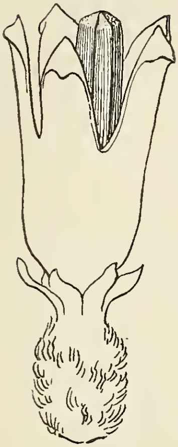


Fig. 1

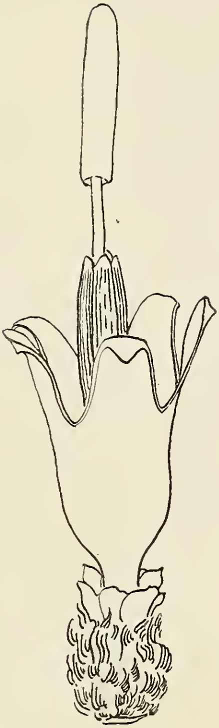


Fig. 2

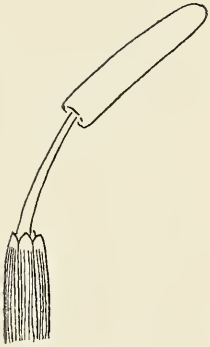


Fig. 3

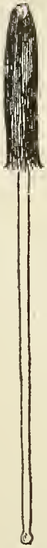


Fig. 4

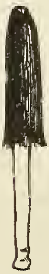


Fig. 5

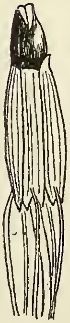


Fig. 6

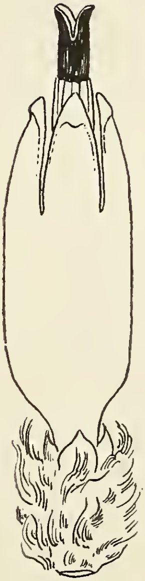
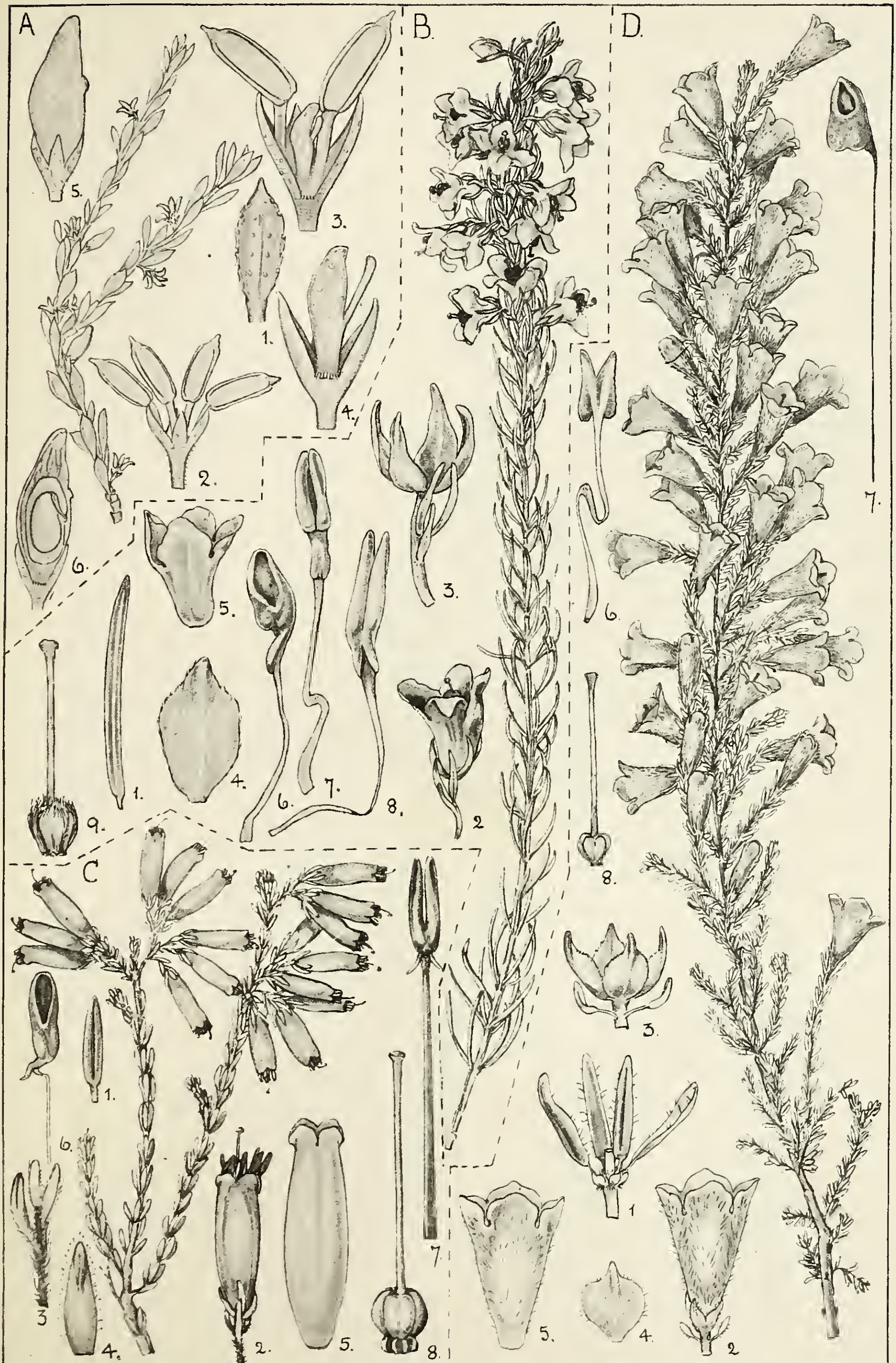


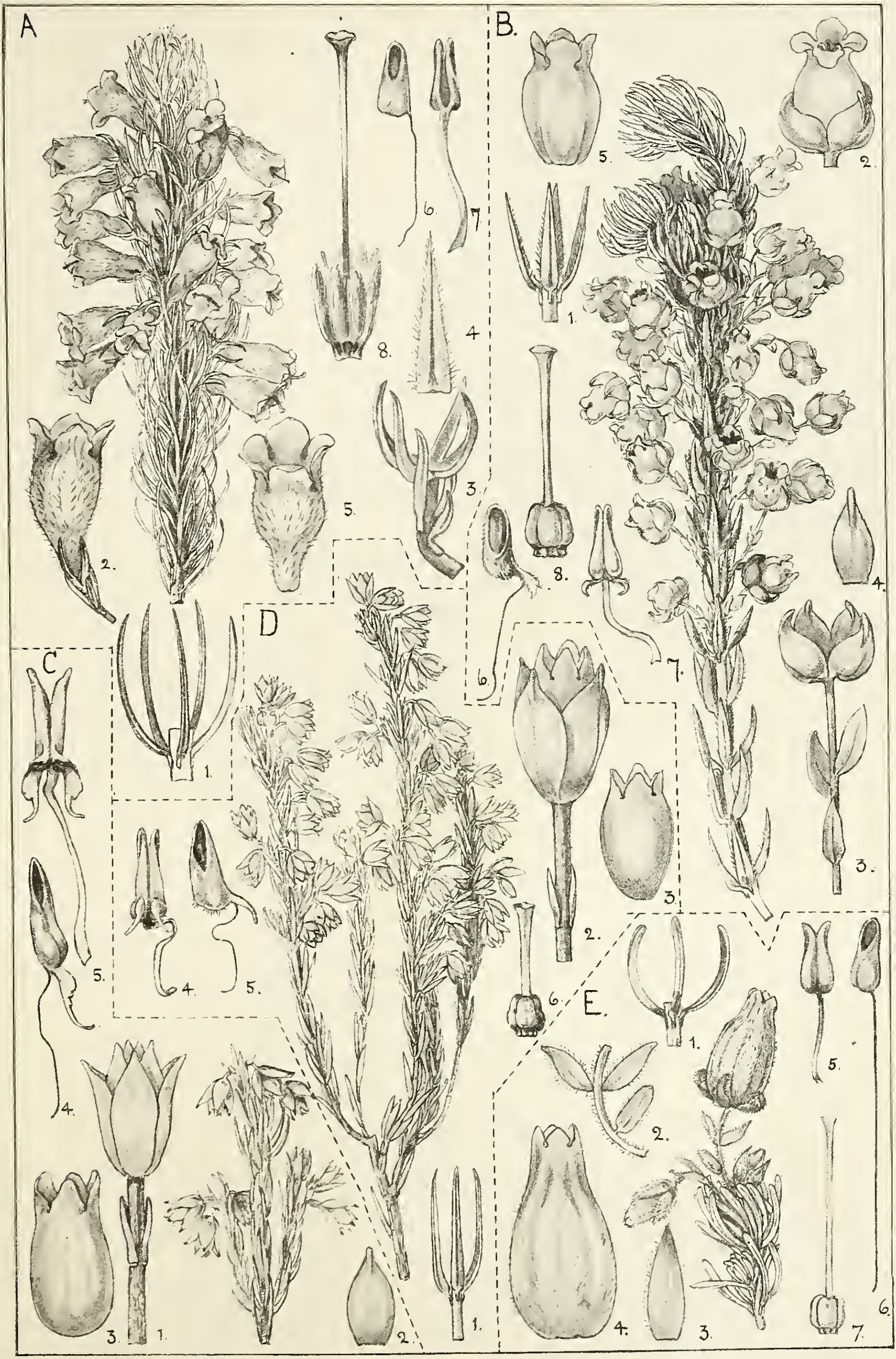
Fig. 7

S. G. del. ad vivam.

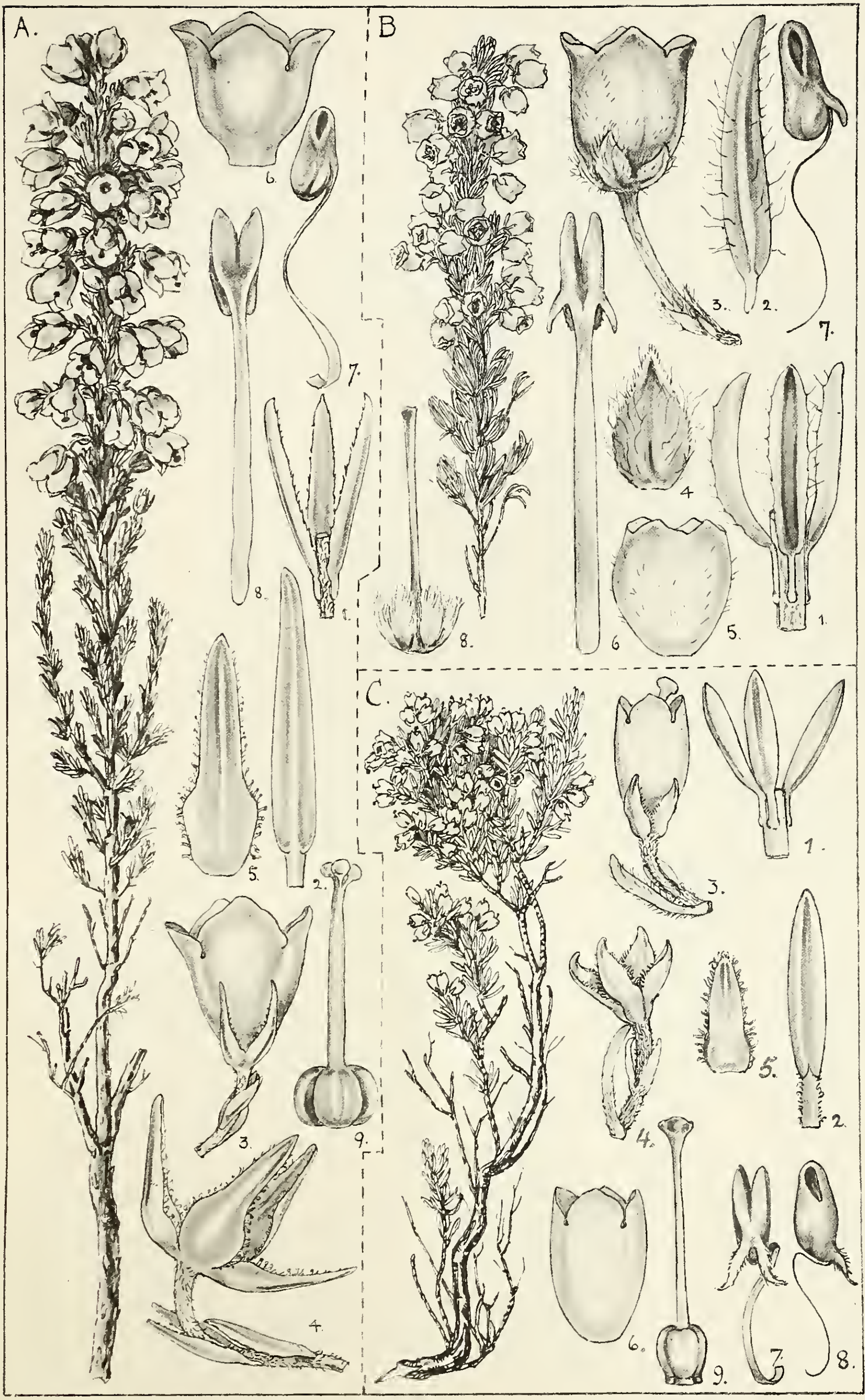
Cryptostemma



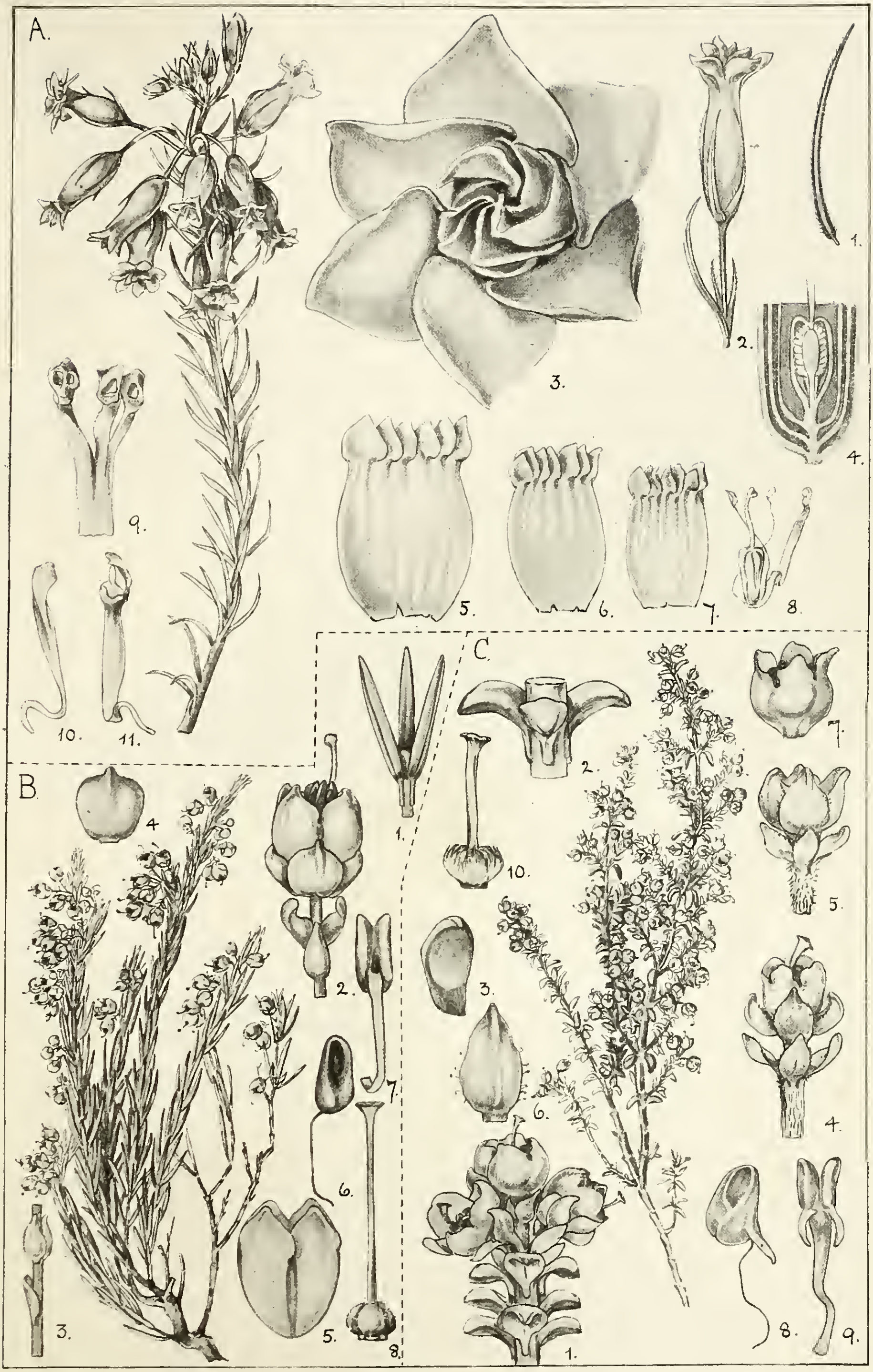
A. *Empleurum fragrans*, Glover.
B. *Erica latiflora*, L. Bolus.
C. *Erica Ethelae*, L. Bolus.
D. *Erica dulcis*, L. Bolus.



A. *Erica gallorum*, L. Bolus.
B. *Erica excavatum*, L. Bolus.
C. *Erica Westii*, L. Bolus.
D. *Erica Symonsii*, L. Bolus.
E. *Erica Cameronii*, L. Bolus.



A. *Erica elimensis*, L. Bolus. B. *Erica Varderi*, L. Bolus.
C. *Erica Dykei*, L. Bolus.



A. *Erica ventricosa*, Thunb., shewing 'doubling.' B. *Erica Pearsoniana*, L. Bolus.
C. *Erica arenaria*, L. Bolus.

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